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A TREATISE

ON THE

Operations of SURGERY,

WITH A

DESCRIPTION and REPRESENTATION

OF THE

INRSTRUMENTS

Uſed in Performing them:

To which is Prefixed an

INTRODUCTION

ON THE

NATURE and TREATMENT

OF

WOUNDS, ABSCESSES, and ULCERS.

By SAMUEL SHARPE,

Fellow of the Royal Society, and Member of the Academy of Surgery at PARIS.

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SANDIFORT
MEDICAL
SOCIETY

TO

WILLIAM CHESELDEN, Esq;

SURGEON to CHELSEA-HOSPITAL.

SIR,

AS I am chiefly indebted to the advantage of an education under You, for whatever knowledge I can pretend to in Surgery, I could not in the least hesitate to whom I should dedicate this Treatise: tho' was it my misfortune to be

a ſtranger to your perſon, that merit which has made the world ſo long eſteem You the ornament of your profeſſion, would alone have induced me to ſhow You this mark of my reſpect, which I hope will not be unacceptable from,

SIR,

Your moſt obedient

humble Servant,

S. SHARPE.

PREFACE.

AS the methods of operating in Surgery have of late years been exceedingly improved in *England*, and there is no treatiſe of character on that ſubject written in our language, I believe it is not neceſſary to apologize for this undertaking. It is true, we have a few tranſlations from the writings of foreigners: but, beſides that they are unaquainted with theſe improvements, their manner of deſcribing an operation is ſo very minute, and in general ſo little pleaſing, that could nothing new be added, or nothing falſe exploded, the poſſibility of only doing it more conciſely and agree-

ably would be a reaſonable inducement to the attempt.

In the deſcription of diſeaſes, I have only mentioned their diſtinguiſhing appearances, and have not once dared to gueſs at the particular diſorder in the animal œconomy, which is the immediate cauſe of them. Indeed the uncertainty there is in conjectures of this intricate nature, and the little ſervice that can accrue to Surgery from ſuch ſpeculative inquiries, have entirely deterred me from all pretence to this ſort of theory: and ſince the moſt ingenious men hitherto, have not by the help of *hypotheſis* done any conſiderable ſervice to the practice of Surgery, nay, for the moſt part have miſled young Surgeons from the ſtudy of the ſymptoms and cure of diſeaſes, to an idle turn of reaſoning, and a certain ſtyle in converſation, which has very much diſcredited the art amongſt men of ſenſe;

I hope I am right in my ſilence on that head.

It has been very much my endeavour to make this treatiſe ſhort; and therefore I have given no hiſtories of caſes, but where the uncommonneſs of the doctrine made it proper to illuſtrate it with fact, and theſe I have recited in the moſt conciſe manner I was able. On this account too, I think I have not attempted to explode any practice which is already in diſrepute; and if it appear otherwiſe to men of ſkill here in *London*, I beg they will refer to thoſe books of Surgery which are now the beſt eſteemed in *Europe*, and to which I have almoſt always had an eye in the criticiſms I have made on the generality of opinions.

It is uſual with moſt writers to deſcribe at length the ſeveral bandages proper to be employed after each operation: but as the manner of applying them can hardly be

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learned from a deſcription only, or, if it could, there is ſo little to be ſaid on that ſubject but what muſt be copied from others, that I have forborn to follow the example; though, to ſay the truth, the purpoſe of bandage being chiefly to maintain the due ſituation of a dreſſing, or to make a compreſs on particular parts, Surgeons always turn a roller with thoſe views, as their diſcretion and dexterity guide them, without any regard to the exact rules laid down in theſe deſcriptions, which are almoſt impoſſible to be retained in the memory without a continual practice of them, and therefore we ſee are not much attended to.

In the firſt edition of this treatiſe, I aſſerted (*p.* 99.) that the hæmorrhage, which ſometimes enſues in the lateral operation, had been eſteemed an objection of ſo great weight, as to have occaſioned its being ſuppreſſed

preſſed in the hoſpitals of *France* by a royal edict. I have ſince been informed I was miſtaken in that particular; and that it had only been forbidden in the *Charité* by Monſieur *Marechal*, the King's firſt Surgeon, who had the inſpection of the practice of Surgery in that hoſpital. What were his motives for not ſuffering this method to be continued there, after having been performed a whole ſeaſon, I will not take upon me to determine.

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INTRO-

INTRODUCTION.

CHAP. I.

Of WOUNDS.

TO conceive rightly of the nature and treatment of wounds, under the variety of diſorders that they are ſubject to, it will be proper firſt to learn, what are the appearances in the progreſs of healing a large wound, when it is made with a ſharp inſtrument, and the conſtitution is pure.

In this circumſtance, the blood-veſſels, immediately upon their diviſion, bleed freely, and continue bleeding till they are either ſtopped by art, or at length, contracting and withdrawing themſelves into the wound, their extremities are ſhut up by the coagulated blood. The hæmorrhage being ſtopped, the next occurrence, in about twenty-four hours, is a thin ſerous diſcharge; and a day or two after an increaſe of it, though ſomewhat thickened and ſtinking. In this ſtate it continues two or three days without any great alteration, from which time the matter grows thicker and leſs offenſive; and

when the bottom of the wound fills up with little granulations of fleſh, it diminiſhes in its quantity, and continues doing ſo till the wound is quite ſkinned over.

The firſt ſtage of healing, or the diſcharge of matter, is by Surgeons called *digeſtion;* the ſecond, or the filling-up with fleſh, *incarnation;* and the laſt, or ſkinning over, *cicatrization.* Theſe are the technical terms chiefly in uſe, and are fully ſufficient to deſcribe the ſtate of wounds, without the farther ſubdiviſions uſually found in Books.

It is worth obſerving, that the loſs of any particular part of the body can only be repaired by the fluids of that diſtinct part. As, in a broken bone, the *callus* is generated from the ends of the fracture; ſo, in a wound, is the cicatrix from the circumference of the ſkin only. Hence ariſes the neceſſity of keeping the ſurface even, either by preſſure or eating medicines, that the eminence of the fleſh may not reſiſt the fibres of the ſkin in their tendency to cover the wound. This eminence is compoſed of little points or granulations, called *fungus* or proud fleſh; and is frequently eſteemed an evil, though in truth this ſpecies of it be the conſtant atttendant on healing wounds; for when they are ſmooth,

and

and have no diſpoſition to ſhoot out above their lips, there is a ſlackneſs to heal, and a cure is very difficultly affected. Since then a *fungus* prevents healing only by its luxuriancy, and all wounds cicatriſe from their circumference, there will be no occaſion to deſtroy the whole *fungus* every time it riſes, but only the edges of it near the lips of the ſkin, which may be done by gentle eſcharoticks, ſuch as lint dipt in a mild ſolution of *vitriol*, or for the moſt part only by dry lint and a tight bandage, which will reduce it ſufficiently to a level if applied before the *fungus* have acquired too much growth. In large wounds, the application of corroſive medicines to the whole ſurface, is of no uſe; becauſe the *fungus* will attain but to a certain height when left to itſelf, which it will be frequently riſing up to though it be often waſted; and as all the advantage to be gathered from it, is only from the evenneſs of its margin, the purpoſe will be as fully anſwered by keeping that under only, and an infinite deal of pain avoided from the continual repetition of eſcharotics.

When I ſpeak of the neceſſity of a wound being repaired by the ſame fluids of which the part was before compoſed, I mean, upon the ſuppoſition that the renewal be of the

ſame ſubſtance with the part injured; as callus is of bone, and a cicatrix is of ſkin: for a vacuity is generally filled up with one ſpecies only of fleſh, though it poſſeſs the ſpace, in which were included, before the wound was made, the diſtinct ſeparate ſubſtances of *membrana adipoſa*, *membrana muſculorum*, and *the muſcle itſelf*; and even if we ſcratch or perforate a bone, there are certain wounded veſſels in it that puſh out fleſh which becomes the covering of it; and after fractures of the ſkull, when the ſurface of the brain is hurt, and part of the membranes and bones removed, the whole cavity is filled up by nearly the ſame uniform ſubſtance, till it arrive even with the ſkin, which ſpreads over it to complete the cure.

On this account it is, that after the healing of wounds, where the ſurface of the bone has been bare, the cicatrix is always adherent to it, and no abſolute diſtinction of parts preſerved; though if a wound be made of any certain magnitude, the adherence, after healing, will not be ſo wide as the wound itſelf was, but only of the extent of the cicatrix, which is always much ſmaller than the inciſion; becauſe healing does not conſiſt only in the forming of new matter, but alſo in the elongation of the fibres

fibres of the circumjacent ſkin and fleſh towards the centre of the wound; which will cover it in more or leſs time, and in greater or leſs quantity, in proportion to their laxneſs; for the ſcar does not begin to form, till they reſiſt any farther extenſion; hence ariſes the advantage in amputations, of ſaving a great deal of ſkin.

From what has been ſaid of the progreſs of a wound made by a ſharp inſtrument, where there is no indiſpoſition of body, we ſee the cure is performed without any interruption but from the *fungus;* ſo that the buſineſs of ſurgery will conſiſt principally in a proper regard to that point, and in applications that will the leaſt interfere with the ordinary courſe of nature, which, in theſe caſes, will be ſuch as act the leaſt upon the ſurface of the wound. And agreeably to this we find, that dry lint only is generally the beſt remedy through the whole courſe of dreſſing. At firſt, it ſtops the blood with leſs injury than any ſtyptic powders or waters; and afterwards, by abſorbing the matter, which in the beginning of ſuppuration is thin and acrimonious, it becomes in effect a digeſtive. During incarnation, it is the ſofteſt medium that can be applied between the roller and ten-

der granulations, and at the ſame time is an eaſy compreſs upon the ſprouting *fungus*.

Over the dry lint may be applied apledgit of ſome ſoft ointment ſpread upon tow, which muſt be renewed every day, and preſerved in its ſituation by a gentle bandage: though, in all large wounds, the firſt dreſſing after that of the accident or operation ſhould not be appplied in leſs than three days; when, the matter being formed, the lint ſeparates more eaſily from the part; in the removal of which, no force ſhould be uſed, but only ſo much be taken away as is looſe, and comes off without pain.

Perhaps it may apear ſurpriſing that I do not recommend either digeſtive or incarnative ointments, which have had ſuch reputation formerly for their efficacy in all ſpecies of wounds. But as the intent of medicines is to reduce the wound to a natural ſtate, or a propenſity to heal, which is what I have already ſuppoſed it to be in, the end of ſuch applications is not wanted; and in other reſpects, dry lint is more advantageous, as may be learnt from I what have ſaid of its benefits. There are certainly many caſes in which different applications will have their ſeveral uſes; but theſe are when wounds are attended with a variety of circumſtances not ſuppoſed in that I have been

been ſpeaking of; though even when theſe, by the virtue of medicines, are reduced to as kind a ſtate, the method of treating them afterwards ſhould be the ſame, as will be better underſtood by the next chapter, in which I ſhall treat more particularly of the dreſſing of wounds.

CHAP. II.

Of Inflammations and Abſceſſes.

AS almoſt all abſceſſes are the conſequences of inflammations, and theſe produce a variety of events, as they are differently complicated with other diſorders, it will be proper firſt to make ſome inquiry into their diſpoſition. Inflammations from all cauſes have three ways of terminating; either by diſperſion, ſuppuration, or gangrene. A ſcirrhous gland is always mentioned as a fourth; but, I think, with impropriety, ſince it ſeldom or never occurs but in venereal, ſcrophulous, or cancerous caſes, when it is the forerunner, and not the conſequence, of an inflammation, the tumour generally appearing ſome time before the diſcolouration.

But though every kind of inflammation will ſometimes terminate in different ſhapes, yet a probable conjecture of the event

may be always gathered from the ſtate of the patient's health. Thus inflammations happening in a ſlight degree upon colds, and without any foregoing indiſpoſition, will moſt probably be diſperſed: Thoſe which follow cloſe upon a fever, or happen to a very groſs habit of body, will generally impoſthumate; and thoſe which fall upon very old people, or dropſical conſtitutions, will have a ſtrong tendency to gangrene.

If the ſtate of an imflammation be ſuch as to make the diſperſion of it ſafely practicable, that end will be beſt brought about by evacuations, ſuch as plentiful bleeding and repeated purges: The part itſelf muſt be treated with fomentations twice a day; and if the ſkin be very tenſe, it may be embrocated with a mixture of three fourths of oil of roſes, and one fourth of common vinegar, and afterwards be covered with *unguent. flor. ſamb.* or a ſoft ointment made of white wax and ſweet oil, ſpread upon a fine rag, and rolled on gently. I know that almoſt all Surgeons are averſe to the application of any thing unctuous to an inflamed ſkin, upon the ſuppoſition of its obſtructing the pores, and by that means preventing the tranſpiration of the obſtructed fluids, which is imagined to be one of the ways that an inflammation is removed. But whether this reaſoning be founded on

practice

practice or theory only, I am not clear: though I think it very certain, that inflammations left to themſelves often grow ſtiff and painful, and are to be eaſed by any medicine that makes them more ſoft and pliable; which ſhould not incline us to believe, that relaxing medicines interrupted the diſpoſition to a cure. However, to preſerve ſome ſort of medium, in inflammations of the face, where they are eſteemed moſt dangerous, it may be made a rule to uſe nothing more oily than warm milk, with which the face may be embrocated five or ſix times a day. If, after four or five days, the inflammation begins to ſubſide, the purging-waters and manna may take place of other purges, and the embrocation of oil and vinegar be now omitted, or ſooner, if it has begun to excoriate. The ointment of wax and oil may be continued to the laſt: or if, upon concluſion of the cure, the itching of the ſkin ſhould be troubleſome, it may better be relieved by the application of *nutritum*, which is an ointment made of equal parts of diachylon and ſweet oil, melted ſoftly down, and afterwards ſtirred together with a little addition of vinegar till they are cold. During the cure, a thin diet is abſolutely neceſſary; and in the height of the inflammation, the drinking of thin liquors is of great ſervice.

Here

Here I have ſuppoſed that the inflammation had ſo great a tendency to diſcuſſion, as by the help of proper aſſiſtance to terminate in that manner; but when it happens that the diſpoſition of the tumour reſiſts all diſcutient means, we muſt then deſiſt from any farther evacuations, and, as much as we can, aſſiſt nature in the bringing on a ſuppuration.

That matter will moſt likely be formed, we may judge from the increaſe of the ſymptomatic fever, and enlargement of the tumour, with more pain and pulſation; and if a ſmall rigor come on, it is hardly to be doubted. Inflammations after a fever, and the ſmall-pox, almoſt always ſuppurate; but theſe preſently diſcover their tendency, or at leaſt ſhould be at firſt gently treated, as though we expected an impoſthumation. It is a maxim laid down in Surgery, that evacuations are pernicious in every circumſtance of a diſeaſe which is at laſt to end in ſuppuration: But as phyſicians do now acknowledge, that bleeding on certain occaſions in the ſmall-pox, is not only no impediment to the maturation, but even promotes it; ſo, in the formation of abſceſſes, when the veſſels have been clogged, and the ſuppuration has not kindly

ly advanced, bleeding has ſometimes quickened it exceedingly. But, however, this practice is to be followed with caution. Purges are, no doubt, improper at this time; yet if the patient be coſtive, he muſt be aſſiſted with gentle clyſters every two or three days.

Of all the applications invented to promote ſuppuration, there are none ſo eaſy as poultices; but as there are particular tumours very ſlow of ſuppuration, and almoſt void of pain (ſuch, for inſtance, are ſome of the ſcrophulous ſwellings), it will be leſs troubleſome in theſe caſes to wear the gum-plaſters, which may be renewed every four or five days only. Amongſt the ſuppurative poultices, perhaps there is none preferable to that made of bread and milk ſoftened with oil; at leaſt, the advantage of any other over it is not to be diſtinguiſhed in practice. The uſe of ſuppurative plaſters in haſty abſceſſes, or inflammations in a weak or dropſical habit of body, is by no means adviſeable, as they are apt to ſit uneaſy on the inflammation, are often painful to remove when we inquire into the ſtate of the tumour, and by their compreſs in bad conſtitutions add ſomething to the diſpoſition of the part to mortify. The abſceſs may be covered with the poultice twice

twice a-day, till it be come to that ripeneſs as to require opening, which will be known by the thinneſs and eminence of the ſkin in ſome part of it, a fluctuation of the matter, and generally ſpeaking an abatement of the pain previous to theſe appearances. The manner of opening an abſceſs I ſhall deſcribe, after having ſpoken of a gangrene, which is the other conſequence of an inflammation.

The ſigns of a gangrene are theſe: The inflammation loſes its redneſs, and becomes duſkiſh and livid; the tenſeneſs of the ſkin goes off, and feels to the touch flabby or emphyſematous; veſications filled with ichor of different colours ſpread all over it; the tumour ſubſides, and from a duſkiſh complexion turns black; the pulſe quickens and ſinks; and profuſe ſweats coming on, at laſt grow cold, and the patient dies.

To ſtop the progreſs of a mortification, the method of treatment will be nearly the ſame, from whatever cauſe it proceed, except in that ariſing from cold; in which caſe we ought to be cautious not to apply warmth too ſuddenly to the part, if it be true, that in the northern countries they have daily conviction of gangrenes produced by this means, which might have been eaſily prevented by avoiding heat; nay, they

carry

carry their apprehenſion of the danger of ſudden warmth ſo far, as to cover the part with ſnow firſt, which they ſay ſeldom fails to obviate any ill conſequence.

The practice of ſcarifying gangrenes by ſeveral inciſions, is almoſt univerſal; and, I think, with reaſon; ſince it not only ſets the parts free, and diſcharges pernicious ichor, but makes way for whatever efficacy there may be in topical applications. Theſe are different with different Surgeons: but I believe the digeſtives ſoftened with oil of turpentine are as good dreſſings as any for the ſcarifications; and upon them, all over the part, may be laid the *Theriaca Londinenſis*, which ſhould be always uſed in the beginning of a gangrene before the neceſſity of ſcarifying ariſes, or what is equally good, if not often preferable, a cataplaſm made with lixivium and bran, and applied warm, which will retain its heat better than moſt other topicals. There are ſome who inſiſt upon having had particular ſucceſs in the ſtopping of gangrenes, from the uſe of the grounds of ſtrong beer mixed with bread or oatmeal. But there are hardly any facts leſs proper to infer from, than the ceaſing of a mortification; ſince we ſee, amongſt the poor that are brought into the hoſpitals, how often it happens without any

aſſiſtance

aſſiſtance. However, it is certain, that ſervice may be done by ſpirituous fomentations, and the dreſſings above mentioned, which are to be repeated twice a-day. Medicines alſo given internally are beneficial; and theſe ſhould conſiſt of the cordial kind, though at preſent the bark is ordered by a great many ſurgeons as the ſovereign remedy for this diſorder. After the ſeparation of the eſchar, the wound becomes a common ulcer, and muſt be treated as ſuch.

There are two ways of opening an abſceſs; either by inciſion or cauſtic; but inciſion is preferable in moſt caſes. In ſmall abſceſſes, there is ſeldom a neceſſity for greater dilatation than a little orifice made with the point of a lancet; and in large ones, where there is not a great quantity of ſkin diſcoloured and become thin, an inciſion to their utmoſt extent will uſually anſwer the purpoſe; or, if there be much thin diſcoloured ſkin, a circular or oval piece of it muſt be cut away: which operation, if done dexterouſly with a knife, is much leſs painful than by cauſtic, and at once lays open a great ſpace of the abſceſs, which may be dreſſed down to the bottom, and the matter of it be freely diſcharged; whereas, after a cauſtic, tho' we make inciſions through the eſchar, as is the uſual practice,

practice, yet the matter will be under ſome confinement, and we cannot have the advantage of dreſſing properly, till the ſeparation of the ſlough, which often requires a conſiderable time, ſo that the cure muſt be neceſſarily delayed; beſides that the pain of burning, continuing two or three hours, which a cauſtic uſually requires in doing its office, draws ſuch a fluxion upon the ſkin round the eſchar as ſometimes to indiſpoſe it very much for healing afterwards. In the uſe of cauſtics, it is but too much a practice to lay a ſmall one onthe moſt prominent part of a large tumour, which not giving ſufficient vent to the matter, and perhaps the orifice ſoon after growing narrow, leads on to the neceſſity of employing tents; which two circumſtances more frequently make fiſtulas after an abſceſs, than any malignity in the nature of the abſceſs itſelf. The event would more certainly be the ſame after a ſmall inciſion: but I obſerve, that ſurgeons, not depending ſo much upon ſmall openings by inciſion, as by cauſtic, do, when they uſe the knife, generally dilate ſufficiently; whereas, in the other way, a little opening in the moſt depending part of the tumour uſually ſatisfies them. But as the method of making ſmall orifices for great diſcharges is for the moſt

moſt part tedious of cure, very often requiring dilatation at laſt, and now and then pernicious in the conſequence above mentioned, and even making the adjacent bones carious, I thought it might not be uſeleſs to caution againſt this practice.

Here it may not be amiſs to obſerve, that notwithſtanding the depending part of an abſceſs is eſteemed the moſt eligible for an opening, yet it is always on the ſuppoſition that the teguments are as thin in that place as any other part of it; otherwiſe it will be generally adviſeable to make the inciſion where nature indicates, that is, where the tumour is inflamed and prominent, though it ſhould not be in a depending part.

The indiſcriminate application of cauſtick to all abſceſſes, often runs into the ſame miſchief of tedioufneſs in the cure, from a cauſe exactly the reverſe of that I have been deſcribing: for as, in great ſwellings, they are ſeldom laid on large enough, and the matter continues draining for want of a ſufficient opening; ſo, in ſmall ones, they make a greater opening than is neceſſary, and therefore demand a greater length of time to repair the wound. I confeſs, the diſpoſition of abſceſſes to fill up after the diſcharge of matter, is ſo very different, that ſome few large ones do well after the mere

mere puncture of a lancet, if the orifice be made in a depending part, and a proper bandage can be applied; tho' if ever we truſt to ſuch an opening, it ſhould be in abſceſſes about the face, where we ſhould be more careful to avoid the deformity of a ſcar than in any other part, and where alſo the method will be more likely to ſucceed, from their ſituation; it being a maxim in ſurgery, that abſceſſes and ulcers will have a greater or leſs tendency to heal, as they are higher or lower in the body. However, even in abſceſſes of the face, if the ſkin be very thin, it will be always ſafer to open the length of it, than truſt to a puncture only.

From this account of the method of opening abſceſſes, it does not appear often neceſſary to apply cauſtics: yet they have their advantages in ſome reſpects, and are ſeldom ſo terrible to patients as the knife, tho' in fact they are frequently more painful to bear. They are of moſt uſe in caſes where the ſkin is thin and inflamed, and we have reaſon to think the malignity of the abſceſs is of that nature as to prevent a quickneſs of incarning; in which circumſtance, if an inciſion only were made thro' the ſkin, little ſinuſes would often form, and burrow underneath, and the lips of it lying looſe and flabby would become callous, and retard

the cure, tho' the malignity of the wound were corrected. Of this kind are venereal buboes; which, notwithſtanding they often do well by mere inciſion, yet when the ſkin is in the ſtate I have ſuppoſed, the cauſtic is always preferable, as I have had many opportunities of being convinced. It is to be obſerved, I confine this method to venereal buboes; for thoſe which follow a fever, or the ſmall-pox, for the moſt part are curable by inciſion only. There are many ſcrophulous tumours, where the reaſoning is the ſame as in the venereal; and even in great ſwellings where I have recommended inciſion, if the patient will not ſubmit to cutting, and the ſurgeon is apprehenſive of any danger in wounding a large veſſel, which is often done with the knife, (tho' it may readily be taken up with the needle and ligature), yet as this inconvenience is avoided by cauſtic, it may on ſuch an occaſion be made uſe of: but I think, after the eſchar is made, it ſhould be cut almoſt all away; which will be no pain to the patient, and will give a much freer diſcharge to the matter than inciſions made thro' it. However, in ſcrophulous ſwellings of the neck and face, unleſs they are very large, cauſtics are not adviſeable, ſince in that part of the body, with length of time, they heal after inciſion. Cauſtics

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are of great ſervice in deſtroying ſtubborn ſcrophulous indurations of the glands, alſo venereal indurations of the glands of the groin, which will neither diſcuſs nor ſuppurate; likewiſe in expoſing carious bones, and making large iſſues. The beſt cauſtic in uſe is a paſte made with lime and *lixivium capitale*; which is to be prevented from ſpreading, by cutting an orifice in a piece of ſticking plaſter, nearly as big as you mean to make the eſchar; which being applied to the part, the cauſtick muſt be laid on the orifice and preſerved in its ſituation by a few ſlips of plaſter laid round its edges, and a large piece over the whole. When iſſues are made, or bones expoſed, the eſchar ſhould be cut out immediately, or the next day: for if we wait the ſeparation, we miſcarry in our deſign of making a deep opening; ſince ſloughs are flung off by the ſprouting new fleſh underneath, which fills up the cavity at the ſame time that it diſcharges the eſchar, ſo that we are obliged afterwards to make the opening a ſecond time with painful eſcharotic medicines. To make an iſſue, or lay a bone bare, this cauſtic may lie on about four hours; to deſtroy a large gland, five or ſix; and to open abſceſſes, an hour and a half, two hours, or three hours, according to the thickneſs

of the ſkin; and what is very remarkable, notwithſtanding its ſtrength and ſudden efficacy, it frequently gives no pain where the ſkin is not inflamed, as in making iſſues, and opening ſome few abſceſſes.

Hitherto I have ſuppoſed the ſurgeon has had the opportunity of opening the tumour at the moſt eligible time, that is, when the ſkin is thin, and the fluctuation of the matter very ſenſible, which is always to be waited for, notwithſtanding it be very much taught, to open critical abſceſſes before they come to an exact ſuppuration, in order to give vent ſooner to the noxious matter of the diſeaſe. But in opening before this period, practitioners miſs the very deſign they aim at; ſince but little matter is depoſited in the abſceſs before it arrives towards its ripeneſs; and beſides, the ulcer afterwards grows foul, and is leſs diſpoſed to heal.

When an abſceſs is already burſt, we are to be guided by the probe where to dilate, obſerving the ſame rules with regard to the degree of dilatation as in the other caſe. The uſual method of dilating is with the probe-ſciſſars; and indeed in all abſceſſes the generality of ſurgeons uſe the ſciſſars, after having firſt made a puncture with a lancet: but as the knife operates much more quickly and with leſs violence to the parts than

than ſciſſars, which ſqueeze at the ſame time that they wound, it will be ſparing the patient a great deal of pain to uſe the knife, wherever it is practicable, which is in almoſt all caſes, except ſome *fiſtulæ in ano*, where the ſciſſars are more convenient. The manner of opening with a knife, is by ſliding it on a director, the groove of which prevents its being miſguided. If the orifice of the abſceſs be ſo ſmall as not to admit the director, or the blade of the ſciſſars, it muſt be enlarged by a piece of ſponge-tent, which is made by dipping a dry bit of ſponge in melted wax, and immediately ſqueezing as much out of it again as poſſible between two pieces of tile or marble; the effect of which is, that the looſe ſponge being compreſſed into a ſmall compaſs, if any of it be introduced into an abſceſs, the heat of the part melts down the remaining wax that holds it together, and the ſponge, ſucking up the moiſture of the abſceſs, expands, and in expanding opens the orifice wider, and by degrees, ſo as to give very little pain.

The uſual method of dreſſing an abſceſs the firſt time is with dry lint only; or, if there be no flux of blood, with ſoft digeſtives ſpread on lint. If there be no danger of the upper part of the wound reuniting too ſoon,

the doſſils muſt be laid in looſe; but if the abſceſs be deep and the wound narrow, as is the caſe ſometimes of abſceſſes *in ano*, the lint muſt be crammed in pretty tightly, that we may have afterwards the advantage of dreſſing down to the bottom without the uſe of tents, which are almoſt univerſally decried in theſe days, though they ſtill continue to be employed too much by the very people who would ſeem to explode them moſt; ſo difficult is it to be convinced of the true efficacy of nature in the healing of wounds. Formerly, the virtues of tents have been much inſiſted on, as it was then thought abſolutely neceſſary to keep wounds open a conſiderable time, to give vent to the imaginary poiſon of the conſtitution. It was ſuppoſed too, that they were beneficial in conveying the proper ſuppurative or ſarcotic medicines down to the bottom of the abſceſs; and again, that, by abſorbing the matter, they preſerved the cleanlineſs of the wound, and diſpoſed it to heal. But this reaſoning is not now eſteemed of any force. Surgeons at preſent know that a wound cannot heal too faſt, provided that it heal firmly from the bottom. They are very well ſatisfied alſo, from what they ſee in wounds where no medicines are applied, that nature of herſelf ſhoots forth new fleſh,

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and is interrupted by any preſſure whatſoever. Beſides, as to the conceit of tents ſucking up the matter, which is eſtemed noxious to healing, they are ſo far from being beneficial in the performance of it, that they are of great prejudice: for if the matter be offenſive in its nature, tho' they do abſorb it, they bring it into contact with every part of the ſinus; and if it be prejudicial by its quantity, they do miſchief in locking it up in the abſceſs, and preventing the diſcharge it would find if the dreſſings were only ſuperficial. But in fact, matter, when it is good, is of no diſſervice to wounds with regard to its quality; and ſurgeons ſhould therefore be leſs curious in wiping them clean, when they are tender and painful. That tents are impediments to healing rather than aſſiſtants, we may learn from conſidering the effect of a pea in an iſſue, which by preſſure keeps open the wound juſt as tents do; and if there are inſtances of wounds healing very well notwithſtanding the uſe of tents, ſo there are alſo of iſſues healing up in ſpite of any meaſures we can take to keep a pea in its cavity. In ſhort, tents in wounds, by reſiſting the growth of the little granulations of fleſh, in proceſs of time harden them, and in that manner produce a fiſtula: ſo that, inſtead of being uſed

for the cure of an abſceſs, they never ſhould be employed but where we mean to retard the healing of the external wound; except in ſome little narrow abſceſſes, where, if they be not crammed in too large, they become as doſſils admitting of incarnation at the botttom. But care ſhould be taken, not to inſinuate them much deeper than the ſkin in this caſe, and that they ſhould be repeated twice a-day, to give vent to the matter they confine. Sometimes they are of ſervice in large abſceſſes, particularly of the breaſt, where the matter cannot diſcharge itſelf by the orifice already made, and yet does not point ſufficiently to any other part for an opening, tho' it makes ſigns whither it would tend if it were a little confined. In ſuch an inſtance, a tent plugging up the orifice would make the matter recur to the part diſpoſed to receive it, and mark the place for a counter-opening: but tents do moſt good in little deep abſceſſes whence any extraneous body is to be evacuated, ſuch as ſmall ſplinters of bone, *&c.*

The uſe of vulnerary injections into abſceſſes has been thought to bear ſo near a reſemblance to the uſe of tents, that they both fell into diſrepute almoſt at the ſame time. It has been ſaid in their favour, that in deep abſceſſes, where no ointment can

can be applied, they digeſt, cleanſe, and correct the malignity of the *pus*. But the fact is, that they do ſo much miſchief by frequently diſtending the parts of the abſceſs, firſt when they are injected, and afterwards by their addition to the matter generated in the abſceſs, that they are hardly proper in any caſe: though one of the great miſchiefs of injections and tents both has been a miſtaken faith amongſt practitioners, that wherever their Medicines were applied, the part would heal; and, upon that preſumption, they have neglected to dilate abſceſſes, which have not only remained incurable after this treatment, but would often have done ſo for want of a diſcharge, if they had been dreſſed more ſuperficially.

In dreſſing wounds, it is common to apply the medicines warm or hot, upon the ſuppoſition that heated ointments have a ſtronger power of digeſting than cold. But as any medicines will ſoon arrive to the heat of the part it is laid on, whether it be applied hot or cold, the efficacy of the heat can avail but little in ſo ſmall a time: and as doſſils dipt in hot ointments are not cleanly, and even grow ſtiff and painful, beſides that the patient is liable to be burnt by laying on too hot, I think it rather preferable

ferable to apply them cold, or perhaps in winter a little warmed before the fire after they are ſpread; obſerving, if the ulcer be uneven, to make the doſſils ſmall in order to lie cloſe. Over the doſſils of lint may be laid a large pledgit of tow ſpread with baſilicon, which will lie ſofter than a defenſative plaſter. For this, though deſigned to defend the circumference of wounds againſt inflammation or a fluxion of humours, is often the very cauſe of them: ſo that the dreſſings of large wounds ſhould never be kept on by theſe plaſters where there is danger of ſuch accidents; and it is on the account of the unfitneſs of plaſters of any kind for an inflammation, that I have omitted to mention any of them as proper diſcutients in that diſorder. In this manner, the dreſſings may be continued till the cavity is incarned, and then it may be cicatriſed with dry lint, or ſome of the cicatriſing ointments; obſerving to keep the *fungus* down, as directed before. If the drying ointment be the *cerat. de lapid. calam.* the ſtone muſt be thoroughly levigated before it be put into it, otherwiſe the ointment will be corroſive.

In the courſe of dreſſing, it will be proper to have regard to the ſituation of the abſceſs, and as much as poſſible to make the patient favour

favour the diſcharge by his ordinary poſture: and to this end alſo, as what is of greater importance than the virtue of any ointment, the diſcharge muſt be aſſiſted by compreſs and bandage, the compreſs may be made of rags or plaiſter; though the latter is ſometimes preferable, as it remains immoveable on the part it is applied to. The frequency of dreſſing will depend on the quantity of diſcharge: once in twenty-four hours is ordinarily ſufficient; but ſometimes twice, or perhaps three times, is neceſſary. I have before mentioned, not to be too ſcrupulouſly nice in cleaning a wound; but it it is worth remarking, that a ſore ſhould never be wiped by drawing a piece of tow or rag over it, but only by daubing it with fine lint, which is a much eaſier method for the patient: the parts about it may be wiped clean in a rougher manner, without any prejudice. I do not think the air has that ill effect on ſores as is generally conceived; nor would the large abſceſſes on beaſts, which are often expoſed to the air the whole time of cure, do well, if it were ſo very pernicious as is repreſented: but as it tends to the making a ſcab, and in winter is a little painful to the new fleſh, it will be right to finiſh the dreſſing as quick as may be, without hurrying. Another caution

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neceſſary in the treatment of abſceſſes is, that ſurgeons ſhould not upon all occaſions ſearch into their cavities with the finger or probe, as it often tears them open and indiſpoſes them for a cure.

CHAP. III.

Of ULCERS.

WHEN a wound or abſceſs degenerates into ſo bad a ſtate as to reſiſt the methods of cure I have hitherto laid down, and loſes that complexion which belongs to a healing wound, it is called an *Ulcer:* and as the name is generally borrowed from the ill habit of the ſore, it is a cuſtom to apply it to all ſores that have any degree of malignity, tho' they be immediately formed without any previous abſceſs or wound; ſuch are the veneral ulcers of the tonſils, *&c.*

Ulcers are diſtinguiſhed by their particular diſorders, tho' it ſeldom happens that the affections are not complicated; and when we lay down rules for the management of one ſpecies of ulcer, it is generally requiſite to apply them to almoſt all others. However, the characters of moſt eminence are, the callous ulcer, the ſinuous ulcer, and the ulcer with caries of the adjacent bone; tho'

tho' there be abundance more known to ſurgeons, ſuch as the putrid, the corroſive, the varicous, &c. But as they have all acquired their names from ſome particular affection, I ſhall ſpeak of the treatment of them under the general head of ulcers.

It will be often in vain to purſue the beſt means of cure by topical application, unleſs we are aſſiſted by internal remedies: for as many ulcers are the effects of a particular indiſpoſition of body, it will be difficult to bring them into order, while the cauſe of them remains with any violence; tho' they are ſometimes in a great degree the diſcharge of the indiſpoſition itſelf, as in the plague, ſmall-pox, &c. But we ſee it generally neceſſary in the pox, the ſcurvy, obſtructions of the menſes, dropſies, and many other diſtempers, to give internals of great efficacy; and indeed there are hardly any conſtitutions where ulcers are not aſſiſted by ſome phyſical regimen. Thoſe that are cancerous and ſcrophulous ſeem to gain the leaſt advantage from phyſic: for if in their beginnings they have ſometimes been very much relieved, or cured by ſalivation, or any other evacuation, they are alſo often irritated, and made worſe by them; ſo that there is nothing very certain in the effects of violent medicines in theſe diſtempers.

diſtempers. I have ſeen alſo great quantities of alteratives tried on a variety of ſubjects; but I cannot ſay with extraordinary ſucceſs. Upon the whole, I think, in both theſe caſes, the milk-diet, and gentle purging with manna, and the waters, ſeem to be moſt efficacious: tho' briſk methods may be uſed with more ſafety in the evil than in the cancer; and ſometimes, particularly in young ſubjects, the decoction of the woods is extremely beneficial for ſcrophulous ulcers: but it has lately been atteſted by men of great ſkill and veracity, that ſea-water is more powerful than any other remedy hitherto known, both for ſcrophulous ulcers, and ſcrophulous tumours.

When an ulcer becomes foul, and diſcharges a naſty thin ichor, the edges of it in proceſs of time tuck in, and, growing ſkinned and hard, give it the name of a callous ulcer; which, ſo long as the edges continue in that ſtate, muſt neceſſarily be prevented from healing. But we are not immediately to deſtroy the lips of it, in expectation of a ſudden cure; for while the malignity of the ulcer remains, which was the occaſion of the calloſity, ſo long will the new lips be ſubject to a relapſe of the ſame kind, however often the external ſurface of them be deſtroyed; ſo that, when we have

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to deal with this circumſtance, we are to endeavour to bring the body of the ulcer into a diſpoſition to recover by other methods. It ſometimes happens to poor laborious people, who have not been able to afford themſelves reſt, that lying a-bed will in a ſhort time give a diverſion to the humours of the part, and the callous edges ſoftening, will without any great aſſiſtance ſhoot out a cicatrix, when the ulcer is grown clean and filled with good fleſh. The effect of a ſalivation is generally the ſame; and even an iſſue does ſometimes diſpoſe a neighbouring ulcer to heal. But tho' calloſities be frequently ſoftened by theſe means, yet when the ſurface of the ulcer begins to yield thick matter, and little granulations of red fleſh ſhoot up, it will be proper to quicken nature by deſtroying the edges of it, if they remain hard. The manner of doing this is by touching them a few days with the lunar cauſtic, or *lapis infernalis;* and ſome chooſe to cut them off with a knife: but this laſt method is very painful, and not, as I can perceive, more efficacious; tho', when the lips do not tuck down cloſe to the ulcer, but hang looſe over it, as in ſome venereal buboes, where the matter lies a great way under the edges of the ſkin, the eaſieſt method is cutting them off with the ſciſſars.

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To digeſt the ulcer, or to procure good matter from it when in a putrid ſtate, there are an infinity of ointments invented; but the *baſilicon flavum* alone, or ſoftened down ſometimes with turpentine, and ſometimes mixt up with different proportions of red precipitate, ſeems to ſerve the purpoſes of bringing an ulcer on to cicatriſation as well as any of the others. When the ulcer is incarned, the cure may be finiſhed as in other wounds; or if it do not cicatriſe kindly, it may be waſhed with *aq. calcis*, or *aq. phag.* or dreſſed with a pledgit dipt in *tinct. myrrhæ:* and if excoriations are ſpread round the ulcer, they may be anointed with *ſperm. cet.* ointment, or *unguent. nutritum.*

The *red precipitate* has of late years acquired the credit it deſerves for the cure of ulcers; but by falling into general uſe, is often very unſkilfully applied. When mixed with the *baſilicon*, or, what is neater, a cerate of wax and oil, it is moſt certainly a digeſtive; ſince it hardly ever fails to make the ulcer yield a thick matter in twenty-four hours, which diſcharged a thin one before the application of it. As greater proportions of it are added to the cerate, it approaches to an eſcharotic; but while it is mixed with any ointment, it is much leſs painful and corroſive than when ſprinkled

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on a ſore in powder; tho' in this form it is almoſt univerſally employed, but I think injudiciouſly; for as it is a ſtrong eſcharotic, much of it can never be uſed without making a ſlough; and therefore continually repeating it day after day will be making a ſucceſſion of ſloughs; or if it be ſprinkled on a ſlough already formed in order to quicken the ſeparation of it, ſo much of the powder as lies on the dead ſurface will be of no force, and the reſt that lies at the bottom and about it will produce other ſloughs there, by keeping under and deſtroying the little granulations of fleſh which in their growth would elevate and puſh off the firſt ſlough, ſo that it cannot be a proper remedy in this caſe. If it be anſwered, that daily practice ſhould convince us that *precipitate* has not this ill effect, ſince we ſee ſloughs continually ſeparating, notwithſtanding the uſe of it; the ſame ſort of argument may be uſed in favour of any bad practice, ſince nature often ſurmounts the greateſt obſtacles to a cure: but whoever will attend carefully, without any prejudice from this reaſoning, to the two methods of promoting the ſeparation of an eſchar, will find it not only more eaſily, but alſo more readily effected by ſoft digeſtives, or the *precipitate* medicine, than by a great quantity of the powder.

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To digeſt the ulcer, or to procure good matter from it when in a putrid ſtate, there are an infinity of ointments invented; but the *baſilicon flavum* alone, or ſoftened down ſometimes with turpentine, and ſometimes mixt up with different proportions of red precipitate, ſeems to ſerve the purpoſes of bringing an ulcer on to cicatriſation as well as any of the others. When the ulcer is incarned, the cure may be finiſhed as in other wounds; or if it do not cicatriſe kindly, it may be waſhed with *aq. calcis*, or *aq. phag.* or dreſſed with a pledgit dipt in *tinct. myrrhæ:* and if excoriations are ſpread round the ulcer, they may be anointed with *ſperm. cet.* ointment, or *unguent. nutritum.*

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as to produce a ſpungy fleſh, ſprouting very high above the ſurface, it will be neceſſary to deſtroy it by ſome of the eſcharotics, or the knife. This *fungus* differs very much from that belonging to healing wounds, being more eminent and lax, and generally in one maſs; whereas the other is in little diſtinct protuberances. It approaches often towards a cancerous complexion; and when it riſes upon ſome glands does actually degenerate ſometimes into a cancer, as has happened in buboes of the groin. When theſe excreſcences have ariſen in venereal ulcers, I have pared them with a knife; but the flux of blood is ordinarily ſo great, that I do not recommend the method, and rather prefer the eſcharotics. Thoſe in uſe are the *vitriol*, the *lunar cauſtic*, the *lapis infernalis*, and more generally the red *precipitate* powder: but even in this caſe, I do not think that powder the beſt remedy; for tho' I have ſaid it is always an eſcharotic, yet the *pulv. angel.* which is a compoſition of the *precipitate* powder and burnt alum, eats deeper, and I think it preferable to the *precipitate* alone.

It is but ſeldom that theſe inveterate *funguſes* appear on an ulcer; but it is very uſual for thoſe of a milder kind to riſe, which may often be made to ſubſide with preſſure

preſſure and the uſe of mild eſcharotics: however, if the aſpect of the ſore be white and ſmooth, as happens in ulcers accompanied with a dropſy, and often in young women with obſtructions, it will anſwer no purpoſe to waſte the excreſcences, till the conſtitution is repaired, when moſt probably they will ſink without any aſſiſtance. In ulcers alſo, where the ſubjacent bone is carious, great quantities of looſe flabby fleſh will grow up above the level of the ſkin: but as the caries is the cauſe of the diſorder, it will be in vain to expect a cure of the excreſcence, till the rotten part of the bone be removed; and every attempt with eſcharotics, will be only a repetition of pain to the patient without any advantage. In ſcrophulous ulcers of the glands, and indeed of almoſt every part, this diſorder is very common; but before trial of the ſevere eſcharotics, I would recommend the uſe of the ſtrong *precipitate* medicine, with compreſs as tight as can be borne without pain, which I think generally keeps it under.

When the excreſcence is cancerous, and does not riſe from a large cancer, but only from the ſkin itſelf, it has been uſual to recommend the actual cautery; though I have found it more ſecure to cut away quite underneath, and dreſs afterwards with eaſy

applications; but the caſes where either of theſe methods are practicable, occur very rarely. As to the treatment of incurable cancerous ulcerations, after much trial, ſurgeons have at laſt diſcovered, that what gives the moſt eaſe to the ſore is the moſt ſuitable application; and therefore the uſe of eſcharotics is not to be admitted on any pretence whatſoever; nor in thoſe parts of a cancer that are corroded into cavities, muſt the *precipitate* be made uſe of to procure digeſtion, or promote the ſeparation of the ſloughs. The beſt way, therefore, is to be guided by the patient, what medicine to continue, after having tried three or four, if the firſt or ſecond do not agree with him. Thoſe uſually preſcribed are preparations from lead: but what I have found moſt beneficial, have been ſometimes dry lint alone, when it does not ſtick to the cancer; at other times, lint doſſils ſpread with *baſilicon* or *cerat. de lapid. calam.* and oftener than either with a *cerate* made of oil and wax or the *ſperma ceti* ointment, and over all a pledget of tow ſpread with the ſame. Embrocating the neighbouring ſkin and edges of it with milk, is of ſervice; but the chief good is to be acquired by diet, which ſhould be altogether of milk and things made of milk, tho' herbage may be admitted

admitted alſo. Iſſues in the ſhoulders or thighs do alſo alleviate the ſymptoms, and manna with the purging waters, once or perhaps twice a-week, will ſerve to keep the body cool. All methods more violent generally exaſperate cancers, and are to be rejected in favour of this, which is ſometimes amazing in its effects, not only procuring eaſe, but lengthening life.

When ulcers or abſceſſes are accompanied with inflammation and pain, they are to be aſſiſted with fomentations made of ſome of the dry herbs, ſuch as Roman wormwood, bay-leaves, and roſemary; and when they are very putrid and corroſive, which circumſtances give them the name of foul phagædenic ulcers, ſome ſpirits of wine ſhould be added to the fomentation, and the bandage be alſo dipt in brandy or ſpirits of wine, obſerving in thoſe caſes where there is much pain always to apply gentle medicines till it be removed.

As to the frequency of dreſſing and fomenting, I think it may be laid down for a rule in all ſores, that where the diſcharge is ſanious and corroſive, twice a-day is not too much: if the matter be not very putrid and thin, once will ſuffice. When the pain and inflammation are exceſſive, bleeding and other evacuations will often be ſervice-

able; and above all things, reſt and a horizontal poſition: which laſt circumſtance is of ſo great importance to the cure of ulcers of the legs, that unleſs the patient will conform to it ſtrictly, the ſkill of the ſurgeon will often avail nothing; for as the indiſpoſition of thoſe ſores is in ſome meaſure owing to the gravitation of the humours downwards, it will be much more beneficial to lie along than ſit upright, tho' the leg be laid on a chair, ſince even in this poſture they will deſcend with more force than if the body was reclined.

In ulcers of the legs accompanied with varices or dilatations of the veins, the method of treatment will depend upon the other circumſtances of the ſore; for the varix can only be aſſiſted by the application of bandage, which muſt be continued a conſiderable time after the cure. The neateſt bandage is the ſtrait ſtocking, which is particularly ſerviceable in this caſe; though alſo, if the legs be œdematous, or if after the healing of the ulcers they ſwell when the patient quits his bed, it may be worn with ſafety and advantage. There are inſtances of one vein only being varicous; which when it happens, may be deſtroyed by tying it above and below the dilatation, as in an aneuriſm; but this operation

ſhould

ſhould only be practiſed where the varix is large and painful.

Ulcers of many years ſtanding are very difficult of cure; and in old people the cure is often dangerous, frequently exciting an aſthma, a diarrhœa, or a fever, which deſtroys the patient unleſs the ſore break out again: ſo that is it not altogether adviſeable to attempt the abſolute cure in ſuch caſes, but only the reduction of them into better order and leſs compaſs; which, if they be not malignant, is generally done with reſt and proper care. The cure of thoſe in young people may be undertaken with more ſafety; but we often find it neceſſary to raiſe a ſalivation to effect it, though when completed it does not always laſt: ſo that the proſpect of cure in ſtubborn old ulcers, at any time of life, is but indifferent. In all theſe caſes, however, it is proper to purge once or twice a-week with *calomel*, if the patient can bear it, and to make an iſſue when the ſore is almoſt healed; in order to continue a diſcharge the conſtitution has been ſo long habituated to, and prevent its falling upon the cicatrix and burſting out again in that place.

When an ulcer or abſceſs has any ſinuſes or channels opening and diſcharging themſelves into the ſore, they are called ſi-

nuous ulcers. Theſe ſinuſes, if they continue to drain a great while, grow hard in the ſurface of their cavity, and then are termed *fiſtulæ*, and the ulcer a *fiſtulous ulcer;* alſo if matter be diſcharged from any cavity, as thoſe of the joints, the abdomen, *&c.* the opening is called a *ſinuous ulcer* or a *fiſtula.*

The treatment of theſe ulcers depends on a variety of circumſtances. If the matter of the ſinus be thick, ſtrict bandage and compreſs will ſometimes bring the oppoſite ſides of the ſinus to a re-union. If the ſinus grow turgid in any part, and the ſkin thinner, ſhowing a diſpoſition to break, the matter muſt be made to puſh more againſt that part, by plugging it up with a tent: and then a counter-opening muſt be made, which proves often ſufficient for the whole abſceſs, if it be not afterwards too much tented, which locks up the matter and prevents the healing; or too little, which will have the ſame effect: for dreſſing quite ſuperficially does ſometimes prove as miſchievous as tents, and for nearly the ſame reaſon; ſince ſuffering the external wound to contract into a narrow orifice, before the internal one be incarned, does almoſt as effectually lock up the matter as a tent. To preſerve then a medium in theſe caſes,

caſes, a hollow tent of lead or ſilver may be kept in the orifice, which, at the ſame time that it keeps it open, gives vent to the matter. The abſceſſes where the counter-openings are made moſt frequently, are thoſe of compound fractures, and of the breaſt; but the latter do oftener well without dilatation than the former, tho' it muſt be performed in both, if practicable, the whole length of the abſceſs. When after ſome trial the matter does not leſſen in quantity, and the ſides of it grow thinner, and if the ſinuſes be fiſtulous, there is no expectation of cure without dilatation. There are alſo a great many ſcrophulous abſceſſes of the neck, that ſometimes communicate by ſinuſes running under large indurations, in which inſtances, counter-openings are adviſeable, and generally anſwer without the neceſſity of dilating the whole length; and indeed there are few abſceſſes in this diſtemper, which ſhould be opened beyond the thinneſs of the ſkin. When abſceſſes of the joints diſcharge themſelves, there is no other method of treating the fiſtula but by keeping it open, with the cautions already laid down, till the cartilages of the extremities of the bones being corroded, the two bones ſhoot into one another, and form an

an anchyloſis of the joint, which is the moſt uſual cure of ulcers in that part.

Gun-ſhot wounds often become ſinuous ulcers, and then are to be conſidered in the ſame light as thoſe already deſcribed; tho' ſurgeons have been always inclined to conceive there is ſomething more myſterious in theſe wounds than any others: but their terribleneſs is owing to the violent contuſion and laceration of the parts, and often to the admiſſion of extraneous bodies into them, as the bullet, ſplinters, cloaths, &c. and were any other force to do the ſame thing, the effect would be exactly the ſame as when done by fire-arms. The treatment of theſe wounds conſiſts in removing the extraneous body as ſoon as poſſible; to which end the patient muſt be put into the ſame poſture as when he received the wound. If it cannot be extracted by cutting upon it, which ſhould always be practiſed when the ſituation of the blood-veſſels, &c. does not forbid, it muſt be left to nature to work out, and the wound dreſſed ſuperficially: for we muſt not expect, that if it be kept open with tents, the bullet, &c. will return that way; and there is hardly any caſe where tents are more pernicious than here, becauſe of the violent tenſion and diſpoſition to gangrene which preſently enſue. To guard

guard againſt mortification in this and all other violently contuſed wounds, it will be proper to bleed the patient immediately, and ſoon after give a clyſter; the part ſhould be dreſſed with ſoft digeſtives, and the compreſs and roller applied very looſe, being firſt dipt in brandy or ſpirits of wine: the next time the wound is opened, if it be dangerous, the ſpirituous fomentation may be employed, and after that continued till the danger is over. If a mortification comes on, the applications for that diſorder muſt be uſed: in gun-ſhot wounds, it ſeldom happens that there is any effuſion of blood unleſs a large veſſel be torn; but the bullet makes an eſchar, which uſually ſeparates in a few days, and is followed with a plentiful diſcharge: but when the wound is come to this period, it is manageable by the rules already laid down.

When an ulcer with looſe rotten fleſh diſcharges more than the ſize of it ſhould yield, and the diſcharge is oily and ſtinking, in all probability the bone is carious; which may eaſily be diſtinguiſhed by running the probe through the fleſh; and if ſo, it is called a *carious ulcer*. The cure of theſe ulcers depends principally upon the removal of the rotten part of the bone, without which it will be impoſſible to heal,

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as we ſee ſometimes even in little ſores of the lower jaw, which, taking their riſe from a rotten tooth, will not admit of cure till the tooth be drawn. Thoſe caries which happen from the matter of abſceſſes lying too long upon the bone, are moſt likely to recover: thoſe of the pox very often do well, becauſe that diſtemper fixes ordinarily upon the middle and outſide of the denſeſt bones, which admit of exfoliation: but thoſe produced by the evil, where the whole extremities or ſpongy parts of the bone are affected, are exceedingly dangerous, tho' all enlarged bones be not neceſſarily carious; and there are ulcers ſometimes on the ſkin that covers them, which do not communicate with the bone, and conſequently do well without exfoliation: nay, it ſometimes happens, tho' the caſe be rare, that, in young ſubjects particularly, the bones will be carious to ſuch a degree, as to admit a probe almoſt through the whole ſubſtance of them, and yet afterwards admit of a cure, without any notable exfoliation.

The method of treating an ulcer with a caries is by applying a cauſtic of the ſize of the ſcale of the bone that is to be exfoliated; and, after having laid it bare, to wait 'till ſuch time as the carious part can, without violence, be ſeparated, and then heal the

the wound. I caution againſt violence, becauſe the little jagged bits of bone that would be left, if we attempted exfoliation before the piece were quite looſe and diſengaged from the ſound bone, would form little ulcerations, and very much retard the cure. In order to quicken the exfoliation, there have been ſeveral applications deviſed; but that which has been moſt uſed in all ages, is the actual cautery, with which ſurgeons burn the naked bone every day, or every other day, to dry up, as they ſay, the moiſture, and by that means procure the ſeparation. But as this practice is never of great ſervice, and always cruel and painful, it is now pretty much exploded. Indeed, from conſidering the appearance of a wound when a ſcale of bone is taken out of it, there is hardly any queſtion to be made, but that burning retards rather than haſtens the ſeparation: for as every ſcale of a carious bone is flung off by new fleſh generated between it and the ſound bone, whatever would prevent the growth of theſe granulations would alſo in a degree prevent the exfoliation; which muſt certainly be the effect of a red-hot iron, applied ſo cloſe to it: though the circumſtances of carious bones and their diſpoſition to ſeparate are ſo different from one another, that it is hardly to be gathered

gathered from experience, whether they will ſooner exfoliate with or without the aſſiſtance of fire: for ſometimes, in both methods, an exfoliation is not procured in a twelvemonth, and at other times it happens in three weeks or a month; nay, I have, upon cutting out the eſchar made by the cauſtic, taken away at the ſame time a large exfoliation: however, if it be only uncertain whether the actual cautery be beneficial or not, the cruelty that attends the uſe of it ſhould entirely baniſh it out of practice. It is often likewiſe, in theſe caſes, employed to keep down the fungous lips that ſpread upon the bone; but it is much more painful than the eſcharotic medicines: tho' there will be no need of either, if a regular compreſs be kept on the dreſſings; or at worſt, if a flat piece of the prepared ſponge, of the ſize of the ulcer, be rolled on with a tight bandage, it will ſwell on every ſide, and dilate the ulcer without any pain.

Some caries of the bones are ſo very ſhallow, that they crumble inſenſibly away, and the wound fills up; but when the bone will neither exfoliate, nor admit of granulations, it will be proper to ſcrape it with a rugine, or perforate it in many points with a convenient inſtrument down to the quick. In the evil, the bones of the *carpus* and *tarſus* are

are often affected; but their ſpongineſs is the reaſon that they are ſeldom cured. So that, when theſe, or indeed the extremities of any of the bones, are carious through their ſubſtance, it is adviſeable to amputate: though there are inſtances in the evil, but more eſpecially in critical abſceſſes, where, after long dreſſing down, the ſplinters, and ſometimes the whole ſubſtance of the ſmall bones, have worked away, and a healthy habit of body coming on, the ulcer has healed; but theſe are ſo rare, that no great dependence is to be laid on ſuch an event. The dreſſings of carious bones, if they are ſtinking, may be doſſils dipt in the tincture of myrrh; otherwiſe thoſe of dry lint are eaſieſt, and keep down the edges of the ulcer better than any other gentle applications.

Burns are generally eſteemed a diſtinct kind of ulcers, and have been treated with a greater variety of applications than any other ſpecies of ſore, every author having invented ſome new medicine to fetch out the fire, as they imagine. And indeed the conceit of a quantity of fire remaining in the part burnt, has occaſioned the trial of very whimſical and painful remedies: tho' people who talk thus ſeriouſly of fire in wounds, do not think of any remaining in

a ſtick that is half burnt and ceaſes to burn any farther; notwithſtanding the reaſoning be the ſame in burns of the fleſh, and burns of a piece of wood.

When burns are very ſuperficial, not raiſing ſuddenly any veſication, ſpirits of wine are ſaid to be the quickeſt relief; but whether they be more ſerviceable than embrocations with linſeed-oil, I am not certain, though they are uſed very much by ſome perſons whoſe trade ſubjects them often to this misfortune. If the burn excoriates, I think it is eaſieſt to roll the part up gently with bandages dipt in ſweet oil, or a mixture of *unguent. flor. ſambuc.* with the oil: when the excoriations are very tender, dropping warm milk upon them every dreſſing is very comfortable; or if the patient can bear to have flannels wrung out of it, applied hot, it may be ſtill better. If the burn have formed eſchars, they may be dreſſed with *baſilicon*, though generally oil alone is eaſier; and in theſe ſores, whatever is the eaſieſt medicine will be the beſt digeſtive. I have ſometimes found it neceſſary to apply different ointments to burns, where the aſpect has been nearly the ſame; and upon changing them, the patient has complained of great pain: ſo that we are obliged ſometimes to determine what is proper,

proper, from trial. The moſt likely things to ſucceed at firſt, are, Oil, *Ungt. flor. ſamb.* *Ungt. baſilicon*, and a Cerate of wax and oil, and afterwards the *Cerate de lapid. calam.* *Ungt. rub. deſiccat.* *Ungt. ſperm. cet.* the *Nutritum* with but little vinegar in it, or perhaps, when the *fungus* riſes, dry lint. There is great care neceſſary to keep down the *fungus* of burns and heal the wound ſmooth: to which end, the edges ſhould be dreſſed with lint dipt in *aqua vitriol.* and dried afterwards; or they may be touched with the vitriol-ſtone, and the dreſſings be repeated twice a-day. There is alſo greater danger of contractions from burns after the cure, than from other wounds; to obviate which, embrocations of neats-foot oil, and bandage with paſte-boards to keep the part extended, are abſolutely neceſſary, where they can be applied.

The EXPLANATION.

A. A director by which to guide the knife in the opening of abſceſſes that are burſt of themſelves, or firſt punctured with a lancet. This inſtrument ſhould be made either of ſteel, ſilver, or iron; but ſo tempered, that it may be bent and accommodated to the direction of the cavity. It is uſu-

ally made quite ſtraight; but that form prevents the operator from holding it firmly while he is cutting, upon which account I have given mine the ſhape here repreſented. The manner of uſing it is, by paſſing the thumb through the ring, and ſupporting it with the fore-finger, while the ſtraight-edged knife is to ſlide along the groove with its edge upwards, towards the extremity of the abſceſs.

B. The ſtraight-edged knife, proper for opening abſceſſes with the aſſiſtance of a director; but which, in few other reſpects, is preferable to the round-edged knife.

C. A crooked needle, with its convex and concave ſides ſharp: this is uſed only in the ſuture of the tendon, and is made thin, that but few of the fibres of ſo ſlender a body as a tendon may be injured in the paſſing of it. This needle is large enough for ſtitching the *tendo Achillis*.

D. The largeſt crooked needle neceſſary for the tying of any veſſels, and ſhould be uſed with a ligature of the ſize of that I have threaded it with in taking up the ſpermatic veſſels in caſtration, or the femoral and humoral arteries in amputation. This needle may alſo be uſed in ſewing up deep wounds.

E. A crooked needle and ligature of the moſt uſeful ſize, being not much too little for

for the largeſt veſſels, nor a great deal too big for the ſmalleſt; and therefore, in the taking up of the greateſt number of veſſels in an amputation, is the proper needle to be employed. This needle alſo is of a convenient ſize for ſewing up moſt wounds.

F. A ſmall crooked needle and ligature for taking up the leſſer arteries, ſuch as thoſe of the ſcalp, and thoſe of the ſkin that are wounded in opening abſceſſes.

Great care ſhould be taken by the makers of theſe needles, to give them a due temper: for if they are too ſoft, the force ſometimes exerted to carry them through the fleſh, will bend them; if they are too brittle, they ſnap; both which accidents may happen to be terrible inconveniences, if the ſurgeon be not provided with a ſufficient number of them. It is of great importance alſo to give them the form of part of a circle; which makes them paſs much more readily round any veſſel, than if they were made partly of a circle and partly of a ſtraight line; and in taking up veſſels at the bottom of a deep wound is abſolutely neceſſary, it being impractible to turn the needle with a ſtraight handle, and bring it round the veſſel when in that ſituation.

The convex ſurface of the needle is flat, and its two edges are ſharp. Its concave ſide is compoſed of two ſurfaces, riſing from

the edges of the needle, and meeting in a ridge or eminence, ſo that the needle has three ſides. This eminence of the ſubſtance of the needle on its inſide ſtrengthens it very much; but it is not continued the whole length of the needle, which is flat towards the eye: ſome are made round in this part; but they cannot be held ſteady between the finger and thumb, and are therefore unfit for uſe. There have been needles made with the eminence on the convex ſide, and a flat ſurface on the concave ſide; but I do not ſee any particular advantage in that ſtructure. The beſt materials for making ligatures are the flaxen thread that ſhoemakers uſe; which is ſufficiently ſtrong when four, ſix, or eight of the threads are twiſted together and waxed, and is not ſo apt to cut the veſſels as threads that are more finely ſpun; though the prevention of this accident will depend in a great meaſure on the dexterity of the operator, who is carefully to avoid the tying them with too great a force.

G. A ſtraight needle, ſuch as glovers uſe, with a three-edged point; uſeful in the uninterrupted ſuture, in the ſuture of tendons, where the crooked one C is not preferred, and in ſewing up dead bodies, and is rather more handy for taking up the veſſels of the ſcalp.

A

TREATISE

OF THE

OPERATIONS of SURGERY.

CHAP. I.

Of SUTURES.

WHEN a wound is recent, and the parts of it are divided by a ſharp inſtrument, without any farther violence, and in ſuch a manner that they may be made to approach each other, by being returned with the hands, they will, if held in cloſe contact for ſome time, reunite by inoſculation, and cement like one branch of a tree ingrafted on another. To maintain them in this ſituation, ſeveral ſorts of ſutures have been invented, and formerly practiſed, but the number of them has of late been very much reduced. Thoſe now chiefly deſcribed are, the interrupted, the glover's, the quilled, the twiſted, and the dry ſutures; but the interrupted and

twiſted, are almoſt the only uſeful ones. For the quilled ſuture is never preferable to the interrupted; the dry ſuture is ridiculous in terms, ſince it is only a piece of plaſter applied in many different ways to re-unite the lips of a wound: and the glover's, or uninterrupted ſtitch, which is adviſed in ſuperficial wounds to prevent the deformity of a ſcar, does rather by the frequency of the ſtitches occaſion it, and is therefore to be rejected in favour of a compreſs and ſticking plaſter; the only inſtance where I would recommend it, is in a wound of the inteſtine: the manner of making this ſuture I ſhall deſcribe in the chapter of *Gaſtroraphy*.

From the deſcription I have given of the ſtate of a wound proper to be ſewed up, it may be readily conceived, that wounds are not fit ſubjects for ſuture, when there is either a contuſion, laceration, loſs of ſubſtance, great inflamamation, difficulty of bringing the lips into appoſition, or ſome extraneous body inſinuated into them; tho' ſometimes a lacerated wound may be aſſiſted with one or two ſtitches. It has for merly been forbidden to ſew up wounds of the head: but this precaution is very little regarded by the moderns; though the ill effects I have frequently ſeen from matter pent up under the ſcalp, and the great convenience there is of uſing bandage on the head, have con-

convinced me, that much leſs harm would be done if ſutures were uſed in this part with more caution.

If we ſtitch up a wound that has none of theſe obſtacles, we always employ the interrupted ſuture, paſſing the needle two, three, or four times, in proportion to the length of it, though there can ſeldom be more than three ſtitches required.

The method of doing it is this: The wound being emptied of the grumous blood, and your aſſiiſtant having brought the lips of it together that they may lie quite even; you carefully carry your needle from without, inwards to the bottom, and ſo on from within outwards; uſing the caution of making the puncture far enough from the edge of the wound, which will not only facilitate the paſſing the ligature, but will alſo prevent it from eating through the ſkin and fleſh; this diſtance may be three or four tenths of an inch: as many more ſtitches as you ſhall make, will be only repetitions of the ſame proceſs. The threads being all paſſed, you begin tying them in the middle of the wound; though if the lips are held carefully together all the while, as they ſhould be, it will be of no great conſequence which is done firſt. The moſt uſeful kind of knot in large wounds, is a ſingle one firſt: over this, a little linen compreſs; on which is to

be made another ſingle knot, and then a ſlip-knot, which may be looſened upon any inflammation: but in ſmall wounds, there is no danger from the double knot alone, without any compreſs to tie it upon; and this is moſt generally practiſed. If a violent inflammation ſhould ſucceed, looſening the ligature only will not ſuffice; it muſt be cut through and drawn away, and the wound be treated afterwards without any ſuture. When the wound is ſmall, the leſs it is diſturbed by dreſſing, the better: but in large ones, there will ſometimes be a conſiderable diſcharge; and if the threads be not cautiouſly carried through the bottom of it, abſceſſes will frequently enſue from the matter being pent up underneath, and not finding iſſue. If no accident happen, you muſt, after the lips are firmly agglutinated, take away the ligatures, and dreſs the orifices which they leave.

It muſt be remembered, that during the cure the ſuture muſt be always aſſiſted by the application of bandage if poſſible, which is frequently of the greateſt importance; and that ſort of bandage with two heads, and a ſlit in the middle, which is by much the beſt, will in moſt caſes be found practicable.

The twiſted ſuture being principally employed in the *Hare-lip*, I ſhall reſerve its deſcription for the chpater on that head.

CHAP.

CHAP. II.

Of the SUTURE *of* TENDONS.

WOUNDS of the tendons are not only known to heal again, but even to admit of ſewing up like thoſe of the fleſhy parts, tho' they do not re-unite altogether in ſo ſhort a time. When a tendon is partly divided, it is generally attended with an exceſſive pain, inflammation, *&c.* in conſequence of the remaining fibres being ſtretched and forced by the action of the muſcle, which neceſſarily will contract more when ſome of its reſiſtance is taken away. To obviate this miſchief, it has been hitherto an indiſputable maxim in Surgery, to cut the tendon quite through, and immediately afterwards perform the ſuture. But I do not think this practice adviſeable; for though the diviſion of the tendon afford preſent eaſe, yet the mere flexion of the joint will have the ſame effect, if, for example, it be a wound of a flexor tendon. Beſides, in order to ſew up the extremities of the tendon when divided, we are obliged to put the limb in ſuch a ſituation that they may be brought into contact, and even to ſuſtain it in that poſture to the finiſhing of the cure. If, then, the poſture will lay the tendon in this poſition, we can likewiſe keep it ſo without uſing the ſuture, and more

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ſure of its not ſlipping away, which ſometimes happens from any careleſs motion of the joint, when the ſtitches have almoſt worn through the lips of the wound; on which account, I would by all means adviſe, in this caſe, to forbear the ſuture, and only to favour the ſituation of the extremities of the tendon by placing the limb properly.

If it ſhould be ſuggeſted, that, for want of a farther ſeparation, there will not be inflammation enough to produce an adheſion of the ſeveral parts of the wound, which is particularly mentioned as the property of this ſort of cicatrix, though it be likewiſe of all others; I ſay that the inflammation will be in proportion to the wound, and a ſmall wound is certainly more likely to recover than a large one. If it ſhould be objected, that keeping the limb in one poſture the whole time of the cure will bring on a contraction of the joint, the objection is as ſtrong againſt the ſuture. And now I am upon this ſubject, I would adviſe ſurgeons to be leſs apprehenſive of contractions after inflammations of the tendons than practice ſhows they are: for perhaps there is hardly any one rule has done more miſchief than that of guarding againſt this conſequence; and I would lay it down as a method to be purſued at all times, to favour the joint in theſe diſorders, and keep it in that poſture we find moſt eaſy for the patient.

patient. The riſk of an immoveable contraction in ſix weeks, is very little; but the endeavour to avoid it has been the loſs of many a limb in half the time.

But when the tendon is quite ſeparated, and the ends are withdrawn from one another, having brought them together with your fingers, you may ſew them with a ſtraight triangular pointed needle, paſſing it from without inwards, and from within outwards; in ſmall tendons, about three tenths of an inch from their extremities; and in the *tendo Achillis*, half an inch. I have ſometimes employed two threads in ſewing up the *tendo Achillis;* and I believe it is generally adviſeable to do ſo, rather than to truſt to a ſingle future.

Some ſurgeons, for fear the muſcle ſhould contract a little notwithſtanding all our care, adviſe not to bring the ends of the tendon into an exact appoſition, but to lay one a little over the other; which, allowing for the contraction that always enſues in ſome degree, the tendon will become a ſtraight line, and not be ſhortened in its length. As the wound of the ſkin will be nearly tranſverſe, I would not have it raiſed to expoſe more of the tendon, but rather ſewed up with it, which will conduce to the ſtrength of the future. The knot of the ligature is to be made as in other wounds, and the dreſſings are to be the ſame: there is a ſort of thin crooked needle that cuts

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on its cancave and convex ſides, which is very handy in the ſuture of large tendons, and to be preferred to the ſtraight one. During the cure, the dreſſings muſt be ſuperficial, and the parts kept ſteady with paſteboard and bandage: the ſmall tendons re-unite in three weeks; but the *tendo Achillis* requires ſix at leaſt, and by violent exerciſe I have known it torn open at the end of ten weeks; though in the inſtance I allude to, I brought the lacerated tendons to a perfect re-union without a ſuture.

CHAP. III.

Of the GASTRORAPHY.

THE account of this operation has engaged the attention of many ſurgical writers, and occaſioned much debate about the proper rules for performing it; and yet what makes the greateſt part of the deſcription can hardly ever happen in practice, and the reſt but very ſeldom. I have been told that *Du Verney*, who was the moſt eminent ſurgeon in the *French* army a great many years, during the wars and faſhion of duelling, declared he never had once an opportunity of practiſing the gaſtroraphy, as that operation is generally deſcribed; for though the word, in ſtrictneſs of etymology, ſignifies no more than ſewing up

up any wound of the belly, yet in common acceptation it implies that the wound of the belly is complicated with another of the inteſtine. Now the ſymptoms laid down for diſtinguiſhing when the inteſtine is wounded, do not with any certainty determine it to be wounded only in one place; which want of information, makes it abſurd to open the *abdomen* in order to come at it. If ſo, the operation of ſtitching the bowels can only take place where they fall out of the *abdomen*, and when we can ſee where the wound is, or how many wounds there are. If it happens that the inteſtines fall out unwounded, the buſineſs of the ſurgeon is to return them immediately, without waiting for ſpirituous or emollient fomentations: and in caſe they puff up ſo as to prevent their reduction by the ſame orifice, you may, with a knife or probe-ſciſſars, ſufficiently dilate it for that purpoſe, or even prick them to let out the wind; laying it down for a rule in this, and all operations where the *omentum* protrudes, to treat it in the method I ſhall deſcribe in the chapter on the *Bubonocele*.

Upon the ſuppoſition of the inteſtine being wounded in ſuch a manner as to require the operation (for in ſmall punctures it is not neceſſary), the method of doing it may be this: Taking a ſtraight needle with a ſmall thread, you lay hold of the bowel with your left hand, and ſew up the wound by the glover's ſtitch; that

that is, by paſſing thro' the lips of the wound, from within outwards all the way, ſo as to leave a length of thread at both ends, which are to hang out of the inciſion of the *abdomen:* then carefully making the interrupted future of the external wound, you pull the bowel by the ſmall threads into contact with the *peritonæum* in order to procure an adheſion, and tie them upon a ſmall bolſter of linen; tho' I think it would be more ſecure to paſs the threads with the ſtraight needle through the lower edges of the wound of the *abdomen*, which would more certainly hold the inteſtine in that ſituation. In about ſix days, it is ſaid, the ligature of the inteſtine will be looſe enough to be cut and drawn away, which muſt be done without great force; in the interim the wound is to be treated with ſuperficial dreſſings, and the patient to be kept very ſtill and low.

CHAP. IV.

Of the BUBONOCELE.

WHEN the inteſtine or *omentum* falls out of the *abdomen* into any part, the tumour in general is known by the name of *hernia*, which is farther ſpecified either from the difference of ſituation or the nature of its contents. When the inteſtine or *omentum* falls through

through the navel, it is called a *hernia umbilicalis*, or *exomphalos*; when thro' the rings of the abdominal muſcles into the groin, *hernia inguinalis*; or if into the *ſcrotum*, *ſcrotalis*: theſe two laſt, tho' the firſt only is properly ſo called, are known by the name of *bubonocele*. When they fall under the *ligamentum Fallopii*, thro' the ſame paſſage that the *iliac* veſſels creep into the thigh, it is called *hernia femoralis*. The *bubonocele* is alſo ſometimes accompanied with a deſcent of the bladder: however, the caſe is very rare; but when it occurs, it is known by the patient's inability to urine till the *hernia* of the bladder is reduced within the *pelvis*. With regard to the contents characteriſing the ſwelling, it is thus diſtinguiſhed: if the inteſtine only is fallen, it becomes an *enterocele*; if the *omentum* (*epiploon*), *epiplocele*; and if both, *entero-epiplocele*. There is, beſides theſe, another kind of *hernia* mentioned and deſcribed by the moderns, when the inteſtine or *omentum* is inſinuated between the interſtices of the muſcles in different parts of the belly. This *hernia* has derived its name from the place affected, and is called the *hernia ventralis*; and laſtly, there have been a few inſtances, where the inteſtines or *omentum* have fallen through the great *foramen* of the *iſchium* into the internal part of the thigh, between and under the two anterior heads of the *triceps* muſcle.

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All the kinds of *hernias* of the inteſtines and *omentum* are owing to a preternatural dilatation of the particular orifices through which they paſs, and not to a laceration of them; which laſt opinion (together with a ſuppoſed laceration of the *peritonæum*) has however prevailed ſo much, as, by way of eminence, to give name to the diſorder which is known more by that of *rupture* than any of thoſe I have mentioned; on which account I ſhall beg leave to make uſe of it myſelf.

The rupture of the groin, or *ſcrotum*, is the moſt common ſpecies of *hernia*, and in young children is very frequent; but it rarely happens in infancy that any miſchiefs ariſe from it. For the moſt part, the inteſtine returns of itſelf into the cavity of the *abdomen* whenever the perſon lies down, at leaſt a ſmall degree of compreſſion will make it. To ſecure the inteſtine when returned into its proper place, there are ſteel-truſſes now ſo artfully made, that, by being accommodated exactly to the part, they perform the office of a bolſter, without galling or even ſitting uneaſy on the patient. Theſe inſtruments are of ſo great ſervice, that, were people who are ſubject to ruptures always to wear them, I believe very few would die of this diſtemper; ſince it often appears, upon inquiry, when we perform the operation for the *bubonocele*, that the neceſſity

neceſſity of the operation is owing to the neglect of wearing a truſs.

In the application of a truſs to theſe kinds of ſwellings a great deal of judgment is ſometimes neceſſary; and for want of it, we daily ſee truſſes put even on *buboes*, indurated teſticles, *hydroceles*, *&c.* But for the *hernias* I have deſcribed, I ſhall endeavour to lay down two or three rules, in order to guide more poſitively to the propriety of applying or forbearing them.

If there is a rupture of the inteſtine only, it is eaſily, when returned into the *abdomen*, ſupported by an inſtrument: but if of the *omentum*, notwithſtanding it may be returned, yet I have ſeldom found the reduction to be of much relief, unleſs there is only a ſmall quantity of it; for the *omentum* will lie uneaſy in a lump at the bottom of the belly, and, upon removal of the inſtrument, drop down again immediately; upon which account, ſeeing the little danger and pain there is in this kind of *hernia*, I never recommend any thing but a bag-truſs, to ſuſpend the *ſcrotum*, and prevent poſſibly by that means the increaſe of the tumour. The difference of theſe tumours will be diſtinguiſhed by the feel; that of the *omentum* feeling flaccid and rumpled; the other more even, flatulent, and ſpringy.

Sometimes in a rupture of both the inteſtine and *omentum*, the gut may be reduced; but

the *omentum* will ſtill remain in the *ſcrotum*: and, when thus circumſtanced, moſt ſurgeons adviſe a bag-truſs only; upon a ſuppoſition that the preſſure of a ſteel one, by ſtopping the circulation of the blood in the veſſels of the *omentum*, would bring on a mortification. But I have learnt, from a multitude of thoſe caſes, that if the inſtrument be nicely fitted to the part, it will be a compreſs ſufficient to ſuſtain the bowel, and at the ſame time not hard enough to injure the *omentum*; ſo that, when a great quantity of inteſtine falls down, tho' it be complicated with the deſcent of the *omentum*, the rupture will conveniently and ſafely admit of this remedy.

There are ſome ſurgeons, who, to prevent the trouble of wearing a truſs when the inteſtine is reduced, deſtroy the ſkin over the rings of the abdominal muſcles with a cauſtic of the ſize of a half-crown piece, and keep their patients in bed till the cure of the wound is finiſhed; propoſing, by the ſtricture of the cicatrix, to ſupport it in the *abdomen* for the future. But by what I have ſeen, the event, tho' often ſucceſsful, is not anſwerable to the pain and confinement; for if, after this operation, the inteſtine ſhould again fall down, which ſometimes happens, there might poſſibly be more danger of a ſtrangulation than before the ſcar was made. This practice ſeems to be more adviſeable on women than on men; becauſe,

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in men, the danger of injuring the ſpermatic cord ſometimes intimidates us from uſing a cauſtic of ſufficient ſtrength to do the proper office.

I have hitherto conſidered the rupture as moveable: but it happens frequently, that the inteſtine, after it has paſſed the rings of the muſcles, is preſently inflamed, which, enlarging the tumour, prevents the return of it into the *abdomen*, and, becoming every moment more and more ſtrangled, it ſoon tends to a mortification, unleſs we dilate the paſſages thro' which it is fallen, with ſome inſtrument, to make room for its return; which dilatation is the operation for the *bubonocele*.

It rarely happens that patients ſubmit to this inciſion before the gut is mortified, and it is too late to do ſervice: not but that there are inſtances of people ſurviving ſmall gangrenes, and even perfectly recovering afterwards. I myſelf have been an eye-witneſs of the cure of two patients, who, ſome time after the operation, when the eſchar ſeparated, diſcharged their fæces thro' the wound, and continued to do ſo for a few weeks in ſmall quantities; when at length the inteſtine adhered to the external wound, and then was fairly healed.

In mortifications of the bowels when fallen out of the *abdomen* into the navel, it is not very uncommon for the whole gangrened in-

teſtine to ſeparate from the ſound one, ſo that the excrement muſt neceſſarily ever after be diſcharged at that orifice. There are likewiſe a few inſtances, where the rupture of the *ſcrotum* has mortified, and become the *anus*, the patient doing well in every other reſpect: nay, I have had one inſtance of this nature under my care, in which the excrements were voided totally by the *ſcrotum* for three weeks or a month; yet by degrees, as the wound healed, they paſſed off chiefly in their natural courſe, and at laſt almoſt wholly ſo. Theſe caſes, however, are only mentioned to furniſh ſurgeons with the knowledge of the poſſibility of ſuch events; and not to miſlead them ſo far as to make favourable inferences with regard to gangrenes of the bowels, which generally are mortal.

Before the performance of the operation for the *bubonocele*, which is only to be done in the extremity of danger, the milder methods are to be tried. Theſe are ſuch as will conduce to ſoothe the inflammation: for as to the other intent of ſoftening the excrements, I believe it is much to be queſtioned whether there can be any of that degree of hardneſs as to form the obſtruction; and, in fact, thoſe operators who have unluckily wounded the inteſtine, have proved, by the thin diſcharge of fæces which has followed upon the inciſion, that the induration we feel is the tenſion of the

the parts, and not the hardened lumps of excrement.

Perhaps, except the pleuriſy, no diſorder is more immediately relieved by plentiful bleeding than this. Clyſters repeated, one after another, three or four times, if the firſt or ſecond are either retained too long, or immediately returned, prove very efficacious: theſe are ſerviceable, not only as they empty the great inteſtines of their excrements and flatulencies, which laſt are very dangerous; but they likewiſe prove a comfortable fomentation, by paſſing through the colon all round the *abdomen*. The *ſcrotum* and groin muſt, during the ſtay of the clyſter, be bathed with warm ſtoups wrung out of a fomentation; and, after the part has been well fomented, you muſt attempt to reduce the rupture. For this purpoſe, let your patient be laid on his back, ſo that his buttocks may be conſiderably above his head; the bowels will then retire towards the diaphragm, and give way to thoſe which are to be puſhed in. If, after endeavouring two or three minutes, you do not find ſucceſs, you may ſtill repeat the trial: I have ſometimes at the end of a quarter of an hour returned ſuch as I thought deſperate, and which did not ſeem to give way in the leaſt till the moment they went up. However, this muſt be practiſed with caution, for too much rough handling will be pernicious.

If, notwithſtanding theſe means, the patient continues in very great torture, tho' not ſo bad as to threaten an immediate mortification, we muſt apply ſome ſort of poultice to the *ſcrotum:* that which I uſe in this caſe, is, equal parts of oil and vinegar made into a proper conſiſtence with oatmeal. After ſome few hours, the fomentation is to be repeated, and the other directions put in practice; and if theſe do not ſucceed, I am inclined to think it adviſeable to prick the inteſtine in five or ſix places with a needle, as recommended by *Peter Lowe*, an old *Engliſh* writer, who ſays, he has often experienced the good effects of this method in the inguinal *hernia*, when all other means have failed.

After all, ſhould the pain and tenſeneſs of the part continue, and hiccoughs and vomitings of the excrement ſucceed, the operation muſt take place; for if you wait till a languid pulſe, cold ſweats, ſubſiding of the tumour, and emphyſematous feel, come on, it will be moſt likely too late, as they are pretty ſure ſymptoms of a mortification.

To conceive rightly of the occurrences in this operation, it muſt be remembered, that in every ſpecies of rupture, a portion of the *peritonæum* generally falls down with whatever makes the *hernia;* which, from the circumſtance of containing immediately the contents of the tumour, is called the *ſac* of the *hernia*.

Now

Now the portion of the *peritonæum*, which uſually yields to the impulſion of the deſcending *viſcera*, is that which correſponds with the inmoſt opening of the abdominal muſcles, juſt where the *membrana cellularis peritonæi* begins to form the *tunica vaginalis* of the ſpermatic cord; ſo that the *ſac* with the *viſcera* inſinuate themſelves into the *tunica vaginalis* of the ſpermatic cord, and lie upon the *tunica vaginalis* of the teſticle. Nevertheleſs, upon examination, I have alſo frequently found the contents of the *hernia* in contact with the teſticle itſelf, that is to ſay, within the *tunica vaginalis* of the teſticle; which I confeſs has ſurpriſed me, as one would imagine that it could not have been affected, but by burſting through the *peritonæum*. But a late diſcovery has offered an eaſy ſolution of this appearance; which is now eſtabliſhed as a fact, though eſteemed a few years ſince as incredible. It appears by this diſcovery, that for ſome months during geſtation the *teſtes* of the *fætus* remain in the *abdomen*, and when they deſcend into the *tunica vaginalis* there is an immediate communication betwixt the cavity of the *abdomen* and the cavity of the *tunica vaginalis*, which in proceſs of time becomes obliterated by the coalition of the *tunic* with the cord; but if it happen, before the coalition be effected, that the inteſtine or the *omentum* fall into the *ſcrotum*, they will neceſſarily remain in

contact with the *teſtis:* and in this manner, what we eſteemed ſo extraordinary a phenomenon is readily accounted for.

From this deſcription of the deſcent of the *viſcera*, it is evident, that the *herniary ſac* is contained within the *tunica vaginalis*, and ought to give the idea of one bag incloſing another. But in the operation, this diſtinction of coats does not always appear; for the *herniary ſac* ſometimes adheres ſo firmly to the *tunica vaginalis*, that together they make but one thick coat. This adheſion may poſſibly reſult from the preſent inflammation of the parts, which has rendered the operation neceſſary: but I am inclined to believe, that the *herniary ſac* adheres in all *bubonoceles* which are not very recent; and that when we reſtore the *hernia* into the *abdomen*, and ſupport it by a truſs, it is only the *viſcera*, and not the *herniary ſac* which is reduced; at leaſt I have found this to be the caſe in ſeveral that I have diſſected.

The beſt way of laying your patient will be on a table about three feet four inches high, letting his legs hang down; then, properly ſecuring him, you begin your inciſion above the rings of the muſcles, beyond the extremity of the tumour, and bring it down about half the length of the *ſcrotum*, through the *membrana adipoſa*, which will require very little trouble to ſeparate from the *tunica vaginalis*, and

and conſequently will expoſe the rupture for the further proceſſes of the operation. But I cannot help once more recommending it as a thing of great conſequence, to begin the external inciſion high enough above the rings, ſince there is no danger in that part of the wound; and for want of the room this inciſion allows, the moſt expert operators are ſometimes tedious in making the dilatation. If a large veſſel is opened by the inciſion, it muſt be taken up before you procceed farther.

When the *tunica vaginalis* is laid bare, you muſt cut carefully through it and the *peritonæum*, in order to avoid pricking the inteſtines: though, to ſay the truth, there is not quite ſo much danger of this accident as is repreſented; for ſometimes the quantity of water ſeparated in the *ſac* of the *peritonæum*, raiſes it from the inteſtine, and prevents any ſuch miſchief.

It has been conſidered by ſome as an improvement in the operation, where the diſorder is recent, to forbear wounding the *peritonæum*, and to return the *ſac* entire into the *abdomen;* thinking, by this means, to make a firmer cicatrix, and more ſurely to prevent a relapſe for the future. But, beſides that it is often impracticable by reaſon of its adheſion, the ſeeming neceſſity there is of letting out the waters that are frequently fetid, of taking away any part of the *omentum* that may poſſibly

poſſibly be mortified, and which we cannot come at without the inciſion, and laſtly of leaving an opening for the iſſue of the excrements out of the wound, in caſe an eſchar ſhould drop from the inteſtine, (all which accidents happen ſometimes very early), put out of diſpute, in my opinion, the impropriety of this method.

The *peritonæum* being cut through, we arrive to its contents, the nature of which will determine the next proceſs. For if it is inteſtine only, it muſt directly be reduced. But if there is any mortified *omentum*, it muſt be cut off: in order to which it is adviſed to make a ligature above the part wounded, to prevent an hæmorrhage; but it is quite needleſs, and in ſome meaſure pernicious, as it puckers up the inteſtine, and diſorders its ſituation, if made cloſe to it. For my part, I am very jealous that wounds of the *omentum* are dangerous; on which account I cannot paſs over this proceſs of the operation, without cautioning againſt cutting any of it away, unleſs it is certainly gangrened: and when that happens, I think it adviſeable to cut off the mortified part with a pair of ſciſſars, near to the ſound part, leaving a ſmall portion of it to ſeparate in the *abdomen;* which may be done with as much ſafety, as to leave the ſame quantity below a ligature.

When the *omentum* is removed, we next dilate the

the wound; to do which with ſafety, an infinite number of inſtruments have been invented: but, in my opinion, there is none we can uſe in this caſe with ſo good management as a knife; and I have found my finger in the operation a much better defence againſt pricking the bowels, than a director which I intended to employ. The knife muſt be a little crooked, and blunt at its extremity, like the end of a probe. Some ſurgeons perhaps may not be ſteady enough to cut dexterouſly with a knife, and may therefore perform the inciſion with probe-ſciſſars, carefully introducing one blade between the inteſtine and circumference of the rings, and dilating upwards and a little obliquely outwards. When the finger and knife only are employed, the manner of doing the operation will be by preſſing the gut down with the fore-finger, and carrying the knife between it and the muſcles, ſo as to dilate upwards about an inch, which will be a wound generally large enough: but if upon examination it ſhall appear that the inteſtine is ſtrangulated within the *abdomen*, which may poſſibly happen from a contraction of the *peritonæum* near the entrance into the *ſac*, in that caſe the inciſion muſt be continued through the length of the contracted channel, or the conſequence will be fatal, notwithſtanding the inteſtine be reſtored into the *ſcrotum*. On this account, the operator ſhould paſs his

his finger on the *ſac* into the *abdomen*, after the reduction of the gut, in order to diſcover whether it be ſafely returned into its proper place.

The opening being made, the inteſtine is gradually to be puſhed into the *abdomen*, and the wound to be ſtitched up. For this purpoſe, ſome adviſe the quilled, and others the interrupted ſuture, to be paſſed through the ſkin and muſcles: but as there is not ſo much danger of the bowels falling out when a dreſſing and bandage are applied, and the patient all the while kept upon his back, but that it may be prevented by one or two ſlight ſtitches through the ſkin only, I think it by all means adviſeable to follow this method, ſince the ſtricture of a ligature in theſe tendinous parts may be dangerous.

Hitherto, in the deſcription of the *bubonocele*, I have ſuppoſed the contents to be looſe, or ſeparate in the *ſac*: but it happens ſometimes in an operation, that we find not only an adheſion of the outſide of the *peritonæum* to the *tunica vaginalis* and ſpermatic veſſels, but likewiſe of ſome part of the inteſtines to its internal ſurface; and in this caſe there is ſo much confuſion, that the operator is often obliged to extirpate the teſticle, in order to diſſect away and diſentangle the gut; though if it can be done without caſtration, it ought. I believe, however, this accident happens rarely,

rarely, except in thoſe ruptures that have been a long time in the *ſcrotum* without returning; in which caſe the difficulty and hazard of the operation are ſo great, that, unleſs urged by the ſymptoms of an inflamed inteſtine, I would not have it undertaken. I have known two inſtances of perſons ſo uneaſy under the circumſtance of ſuch a load in their *ſcrotum*, though not otherwiſe in pain, as to deſire the operation; but the event in both proved fatal: which, I think, ſhould make us cautious how we expoſe a life for the ſake of a convenience only, and teach our patients to content themſelves with a bag-truſs when in this conditi on.

The dreſſing of the wound firſt of all may be with dry lint, and afterwards as directed in the introduction.

The operation of the *bubonocele* in women ſo nearly reſembles that performed on men, that it requires no particular deſcription, only in them the rupture is formed by the inteſtine or *omentum* falling down through the paſſage of the *ligamentum rotundum* into the groin or one of the *labia pudendi;* where cauſing the ſame ſymptoms as when obſtructed in the *ſcrotum*, it is to be returned by the dilatation of that paſſage.

CHAP.

CHAP. V.

Of the EPIPLOCELE.

THere have been a few inſtances where ſo great a quantity of the *omentum* has fallen into the *ſcrotum*, that by drawing the ſtomach and bowels downwards, it has excited vomitings, inflammation, and the ſame train of ſymptoms as happen in a *bubonocele;* in which caſe, the operation of opening the *ſcrotum* is neceſſary. The inciſion muſt be made in the manner of that for the rupture of the inteſtine, and the ſame rules obſerved with regard to the *omentum* that are laid down in the laſt chapter. It is neceſſary alſo the rings of the muſcles ſhould be dilated; or otherwiſe, though you have taken away ſome of the mortified part of the *omentum*, the reſt that is out of its place, and ſtrangled in the perforation, will gangrene alſo. The wound is to be treated in the ſame manner as that after the operation of the *bubonocele*. What I have here deſcribed as an inducement to the operation, ſhould, by the experience I have had, be the only one. There are a great many people who are ſo uneaſy with ruptures, tho' they are not painful, that a little encouragement from ſurgeons of character will make them ſubmit to any means of cure; but as I have

have ſeen two or three patients, who were in every reſpect hale and ſtrong, die a few days after the operation, the event, though very ſurpriſing, ſhould be a leſſon, never to recommend this method of treating an *epiplocele*, unleſs it is attended with inflammation, *&c.*

CHAP. VI.

Of the HERNIA FEMORALIS.

THIS ſpecies of rupture is the ſame in both ſexes, and formed by the falling of the *omentum*, or inteſtine, or both of them, into the inſide of the thigh, thro' the arch made by the *os pubis* and *ligamentum Fallopii* where the illiac veſſels and tendons of the *pſoas* and *iliacus internus* muſcles paſs from the *abdomen*. It is very neceſſary ſurgeons ſhould be aware of the frequency of this diſorder, which creates the ſame ſymptoms as other ruptures, and muſt firſt of all be treated by the ſame methods. The manner of operating in the reduction is here, too, exactly the ſame, with the difference of dilating the ligament inſtead of the rings of the muſcles; ſo that it would be a mere repetition of the operation for the *bubonocele* to give any deſcription of it: only it may be obſerved, that the ſpermatic cord, as it enters into the *abdomen*, lies nearly tranſverſe

verſe to the inciſion, and cloſe in contact with the ligament; ſo that, unleſs you make the dilatation obliquely outwards, inſtead of perpendicularly upwards, you will probably divide thoſe veſſels.

CHAP. VII.

Of the EXOMPHALOS.

THIS rupture is owing to a protruſion of the inteſtine, or *omentum*, or both of them, at the navel, and rarely happens to be the ſubject of an operation. For though the caſe is common, yet moſt of them are gradually formed from very ſmall beginnings: and if they do not return into the *abdomen* upon lying down, in all probability they adhere, without any great inconvenience to the patient, till ſome time or other an inflammation falls upon the inteſtines, which ſoon brings on a mortification, and death; unleſs, by great chance, the mortified part ſeparates from the ſound one, leaving its extremity to perform the office of an *anus*. In this emergency, however, I think it adviſeable to attempt the reduction, if called in at the beginning; tho' the univerſal adheſion of the *ſac* and its contents is a great obſtacle to the ſucceſs. The inſtance in which it is moſt likely to anſwer, is, when the rupture is owing to any ſtrain

or ſudden jerk, and is attended with thoſe diſorders which follow upon the ſtrangulation of a gut.

In this caſe, having tried all other means in vain, the operation is abſolutely neceſſary; which may be thus performed: Make the inciſion ſomewhat above the tumour, on the left ſide of the navel, through the *membrana adipoſa;* and then emptying the *ſac* of its water, or mortified *omentum*, dilate the ring with the ſame crooked knife, conducted on your finger, as in the operation for the *bubonocele;* after this return the inteſtines and *omentum* into the *abdomen*, and dreſs the wound without making any ligature but of the ſkin only.

CHAP. VIII.

Of the HERNIA VENTRALIS.

THE *hernia ventralis* which ſometimes appears between the *recti* muſcles is very large; but that tumour which requires the operation is ſeldom biger than a walnut, and is a diſeaſe not ſo common as to have been obſerved by many; but there are caſes enough known, to put a ſurgeon upon inquiry after it, when the patient is ſuddenly taken with all the ſymptoms of a rupture, without any appearance of one in the navel, ſcrotum,

or thigh. I have before defined this *hernia* to be a ſtrangulation of the gut in ſome of the interſtices of the muſcles of the *abdomen:* the manner of dilating it will be the ſame as that above directed in the other *hernias*. After the operation in this and all *hernias* where the inteſtines have been reduced, it will be convenient to wear a truſs, ſince the cicatrix is not always firm enough in any of them to prevent a relapſe.

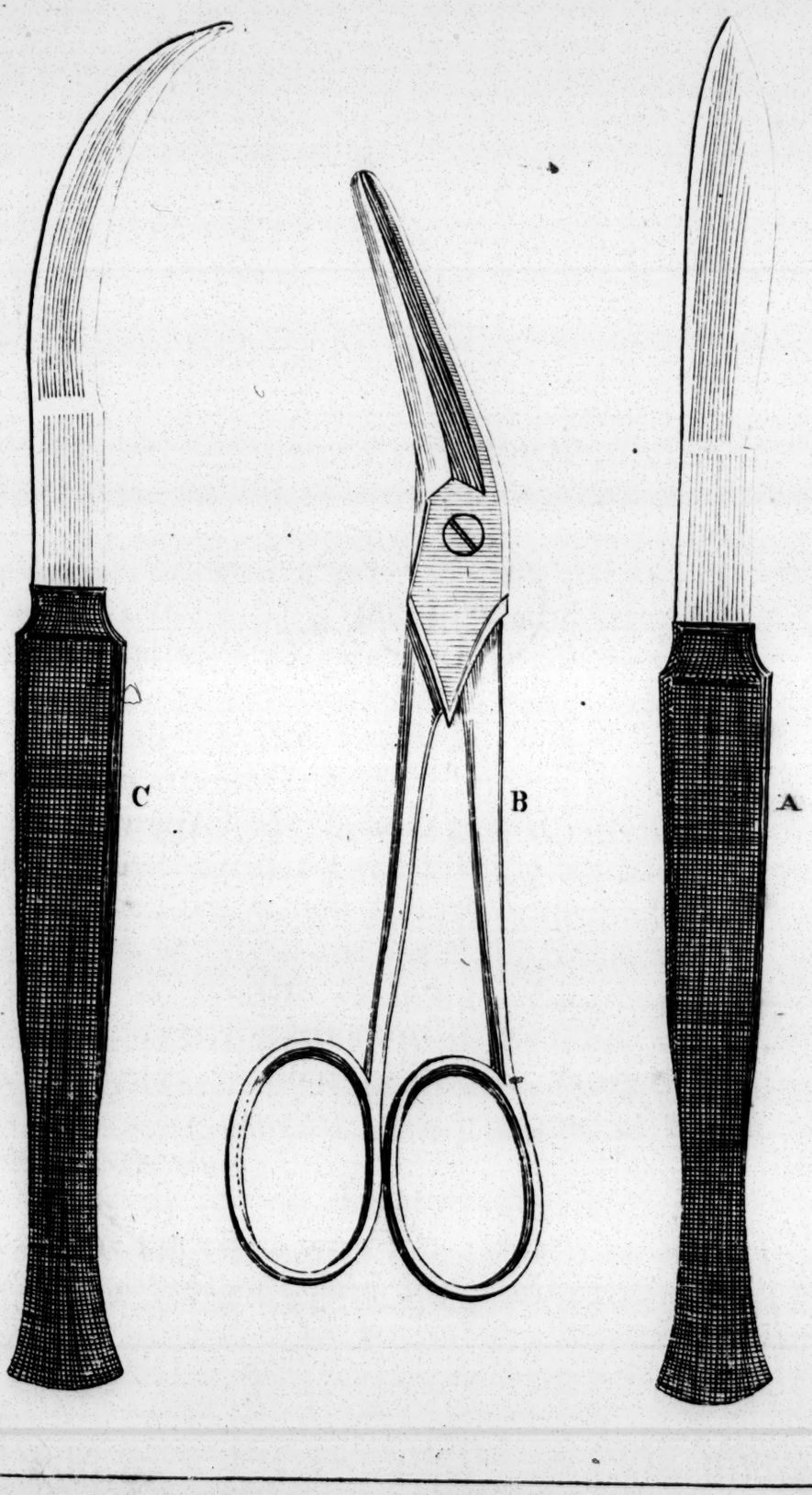
PLATE II.

The EXPLANATION.

A. The round-edged knife of a convenient ſize for almoſt all operations where a knife is uſed: the make of it will be better underſtood by the figure than any other deſcription; only it may be remarked, that the handle is made of a light wood, as indeed the handles of all inſtruments ſhould be, that the reſiſtance to the blades may be better felt by the ſurgeon.

B. A pair of probe-ſciſſars, which require nothing very particular in their form but that the lower blade ſhould be made as ſmall as poſſible, ſo that it is ſtrong and has a good edge; becauſe being chiefly uſed in fiſtulas *in ano*, the introduction of a thick blade into the ſinus, which is generally narrow, would be very painful to the patient.

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C. The crooked knife with the point blunted, uſed in the operation of the *bubonocele.*

CHAP. IX.

Of the HYDROCELE.

THE *hydrocele*, called alſo *hernia aquoſa*, *hydrops ſcroti*, and *hydrops teſtis*, is a watery tumour of the *ſcrotum:* which, notwithſtanding the multiplicity of diſtinctions uſed by writers, is but of two kinds; the one when the water is contained in the *tunica vaginalis*, and the other when in the *membrana cellularis ſcroti.* This laſt is almoſt always complicated with an *anaſarca;* which ſpecies of dropſy is an extravaſation of water lodged in the cells of the *membrana adipoſa*, and when thus circumſtanced will not be difficult to be diſtinguiſhed: beſides that it is ſufficiently characteriſed by the ſhining and ſoftneſs of the ſkin, which gives way to the leaſt impreſſion, and remains pitted for ſome time, the *penis* is likewiſe ſometimes enormouſly enlarged, by the inſinuation of the fluids into the *membrana cellularis;* all which ſymptoms are abſolutely wanting in the dropſy of the *tunica vaginalis.*

In the dropſy of the *membrana cellularis, ſcroti*, the puncture with the trocar is recommended by ſome; and little orifices made

here and there with the point of a lancet, by others; or a ſmall ſkane of ſilk paſſed by a needle through the ſkin, and out again at the diſtance of two or three inches, to be kept in the manner of a ſeton till the waters are quite drained: but the two firſt methods avail very little, as they open but few cells; and the laſt cannot be ſo efficacious in that reſpect as inciſions, and will be much more apt to become troubleſome, and even to gangrene.

Indeed it is not often proper to perform any operation at all upon this part, ſince the *membrana cellularis ſcroti*, being a continuation of the *membrana adipoſa*, ſcarifications made through the ſkin in the ſmall of the legs, will effectually empty the *ſcrotum*, as I have many times experienced; and this place ought rather to be pitched upon than the other, as being more likely to anſwer the purpoſe, by reaſon of its dependency. However it ſometimes happens that the waters fall in ſo great quantities into the *ſcrotum*, as, by diſtending it, to occaſion great pain, and threaten a mortification: the prepuce of the *penis* alſo becomes very often exceſſively dilated, and ſo twiſted that the patient cannot void his urine. In theſe two inſtances, I would propoſe an inciſion of three inches long to be made on each ſide of the *ſcrotum*, quite through the ſkin into the cells containing the water, and two or three

three, of half an inch long, in any part of the *penis*, with a lancet or knife; all which may be done with great ſafety, and ſometimes with the ſucceſs of carrying off the diſeaſe of the whole body. This I can poſitively ſay, that though I have done it upon perſons in a very languid condition, yet, by making the wound with a ſharp inſtrument, and treating it afterwards with fomentations and ſoft digeſtives, I have rarely ſeen any inſtance of a gangrene, which is generally ſo much apprehended in this caſe.

The dropſy of the *tunica vaginalis*, is owing to a preternatural diſcharge of that water which is continually ſeparating in a ſmall quantity on the internal ſurface of the tunic for the moiſtening or lubricating the teſticle, and which, collecting too faſt, accumulates, and forms in time a ſwelling of great magnitude. This is what I take to be the other ſpecies of *hydrocele*, and the only one beſides: though from the time of *Celſus*, down to our own days, the writers on this ſubject make two kinds; one on the inſide of the *tunica vaginalis*, and another between the *ſcrotum* and outſide of it. And among the cauſes aſſigned for this diſtemper, the principal one is the derivation of water from the *aſcites*; which opinion though univerſally received, is abſurd in anatomy: For beſides that people afflicted with a *hydrocele* are very ſel-

dom otherwiſe dropſical, and on the contrary thoſe with an aſcite have no *hydrocele*, the *tunica vaginalis* is like a purſe totally ſhut up on the outſide of the *abdomen*, ſo that no water from any part can inſinuate into it. And with reſpect to the notion of water falling from the *abdomen* into the *tunica vaginalis* and *ſcrotum*, it is equally impoſſible. For though, in the *hernia inteſtinalis*, the gut falls into this part, yet in that caſe the *peritonæum* (which would hinder the egreſs of the water) falls down too, which the anciets did not know, and the moderns have omitted to reflect on in relation to this ſubject. It is true, that where the *aſcites* is complicated with a *hernia inteſtinalis;* or where there has been a previous *hernia* of the *ſcrotum*, and the *ſac* of the *peritonæum* remains within the *ſcrotum;* the water of the *aſcites*, in that caſe, may fall into the *ſac* of the *peritonæum*, and in that manner form a tumour of the *ſcrotum:* but this is not properly a dropſy of the *tunica vaginalis*. It muſt be here underſtood, that when I ſay there is no communication between the cavity of the *abdomen*, and the cavity of the *tunica vaginalis*, I ſpeak of adults: For in the *fætus*, and even in an infant ſtate, there is a communication; and in thoſe few inſtances where the cemmunication is preſerved to adultneſs, the water of an *aſcites* may fall into the *tunica vaginalis*: but this happens ſo rarely, that it

ſhould

ſhould not be conſidered as an impeachment of the preceding doctrine.

The *hydrocele* of the*t unica vaginalis* is very eaſily to be diſtinguiſhed from the *hydrocele* of the *membrana cellularis*, by the preceding deſcription of that ſpecies of dropſy: I ſhall now explain how it differs from the other tumours of the *ſcrotum*, viz. the *bubonocele*, *epiplocele*, and enlarged teſticle. In the firſt place, it is ſeldom or never attended with pain in the beginning, and is very rarely to be imputed to any accident, as the *hernias* of the *omentum* and inteſtine are: for the time it firſt makes its appearance, it very ſeldom is known to diſappear or diminiſh, but generally continues to increaſe, though in ſome much faſter than in others; in one perſon, growing to a very painful diſtenſion in a few months; whilſt, in another, it ſhall not be troubleſome in many years; nay, ſhall ceaſe to ſwell at a certain period, and ever after continue in that ſtate without any notable diſadvantage; tho' this laſt caſe very rarely happens. In proportion as it enlarges it becomes more tenſe, and then is ſaid to be tranſparent. Indeed the tranſparency is made the chief criterion of the diſtemper; it being conſtantly adviſed to hold a candle on one ſide of the *ſcrotum*, which it is ſaid will ſhine through to the other if there be water. But this experiment does not always anſwer, be-

cauſe ſometimes the *tunica vaginalis* is very much thickened, and ſometimes the water itſelf is not tranſparaent: ſo that to judge poſitively if there be a fluid, we muſt be guided by feeling a fluctuation; and tho' we do not perhaps evidently perceive it, yet we may be perſuaded there is a fluid of ſome kind, if we are once aſſured that the diſtenſion of the *tunica vaginalis* makes the tumour, which is to be diſtinguiſhed in the following manner.

If the inteſtine, or *omentum*, form the ſwelling, they will be ſoft and pliable (unleſs inflamed), uneven in their ſurface, particularly the *omentum*, and both of them extend themſelves up from the *ſcrotum* quite into the very *abdomen;* whereas, in the *hydrocele*, the tumour is tenſe and ſmooth, and ceaſes before or at its arrival to the rings of the abdominal muſcles; becauſe the upper extremity of the *tunica vaginalis* terminates at ſome diſtance from the ſurface of the belly.

When the teſticle is increaſed in its ſize, the tumour is rounder; and if not attended with an enlargement of the ſpermatic veſſels, the cord may be eaſily diſtinguiſhed between the ſwelling and *abdomen:* but without this rule of diſtinction, either the pain, or the very great hardneſs, will diſcover it to be a diſeaſe of the teſticle.

As to the cure of this diſtemper by external

nal applications, or internal means: After having tried upon a great variety of ſubjects moſt of the medicines invented to that end, I have found but very little ſatisfaction in the event: for if by chance any one has mended under a phyſical regimen, it muſt be confeſſed too, that there are ſome inſtances of people recovering, who have ſo abſolutely neglected themſelves as not even to wear a bag-truſs; on which account, I ſhould judge it adviſeable to wait with patience till the tumour becomes troubleſome, and then to tap it with a lancet or trocar. In opening with a lancet, it may poſſibly happen, the orifice of the ſkin ſhall ſlip away from that of the tunic, and prevent the egreſs of the water: to obviate which inconvenience, you may introduce a probe, and by that means ſecure the exact ſituation of the wound; but if the coats are much thickened, it will be adviſeable to uſe the trocar, rather than the lancet. It is ſpoken of as an eaſy thing, to hold the teſticle with the left hand, while we make the puncture with the right; but when the *tunica vaginalis* is very tenſe, it cannot well be diſtinguiſhed. However, I think there is no danger of wounding it if you make the puncture in the inferior part of the *ſcrotum*. During the evacuation, the *ſcrotum* muſt be regularly preſſed; and after the operation, a little

little piece of dry lint and ſticking-plaſter are ſufficient.

This method of tapping is called *the palliative cure;* not but that it does now and then prove an abſolute one. To prevent the relapſe of this diſeaſe, ſurgeons preſcribe the making a large wound, either by inciſion or cauſtic, that, upon healing it afterwards, the firmneſs and contraction of the cicatrix may bind up the relaxed lymphatic veſſels, and obſtruct the farther preternatural effuſion of their contents: But by what I have ſeen of this practice, it is generally attended with ſo much trouble, that notwithſtanding its ſucceſs in the end, I believe whoever reads the folowing caſes will be apt to diſcard the method, and abide rather by the palliative cure.

CASE I.

A. B. aged 44, a ſtrong man, never in his life having been ſubject to any other infirmity, put himſelf under my care for the relief of a *hydrocele* on the left ſide of the *ſcrotum*.

December 3, 1733. I diſcharged the water, by making an inciſion thro' the teguments about four inches long. Towards night he grew feveriſh, got no reſt, the *ſcrotum* and teſticle on that ſide beginning to inflame, and the capillary arteries (dilating) to bleed freely. He was ſeized too with a violent pain in

in his back; which was in a great meaſure removed by the ſuſpending the *ſcrotum* with a bag-truſs.

From the 3d to the 7th, continued in a moſt dangerous condition; when the fever tended to a criſis, by the ſuppuration of both wound and teſticle.

From the 7th to the 24th, he daily acquired ſtrength; but the diſcharge from the teſticle increaſing, and the ſinus now penetrating very deep towards the *ſeptum ſcroti*, I opened the body of the teſticle the whole length of the abſceſs.

From the 24th, the diſcharge leſſened ſurpriſingly: ſo that in ſix days, the ſurface of the greateſt part of the teſticle united with the *ſcrotum;* and there remained only a ſuperficial wound, which was entirely cicatriſed on *Jan.* 10. 1733-4.

March 31. 1737, he continued in perfect health.

CASE II.

In the year 1733, I made an inciſion thro' the *ſcrotum* and *tunica vaginalis* of a boy about eight years of age, who narrowly eſcaped with his life: but the ſymptomatic fever terminating at laſt in an abſceſs of the *ſcrotum*, it proved his cure, tho' with ſome trouble, in a few weeks.

CASE

CASE III.

A. C. aged 37, of a very hale habit of body, had complained of a tumour on one ſide of the *ſcrotum;* which continuing to enlarge for ſix years, he applied to a ſurgeon, who laid a ſmall cauſtic on the upper part of it, and, opening the eſchar, emptied near three pints of water; but he relapſing ſoon after this, I undertook the abſolute cure.

December 15th 1736, I laid on the anterior and upper part of the *ſcrotum* a cauſtic about ſix inches long and one broad.

December 16th, by a ſmall puncture thro' the eſchar, I emptied above a quart of water.

From the 17th to the 24th, he continued in a great deal of pain, not only in the part, but in his back and loins, and had very little reſt; the *ſcrotum* on that ſide became exceedingly inflamed and thickened, the ſymptomatic fever running very high, without any ſigns of the digeſtion of the wound.

On the 24th at night he grew a little eaſier, and continued ſo till the 29th, when the ſlough ſeparated; but the wound retained ſtill a bad aſpect, no granulations appearing on its ſurface.

From *December* 29, to *Jan.* 5. he remained in the ſame ſtate.

From the 5th to the 13th, the ſwelling and pain rather increaſed; and that night he was ſeized

ſeized with an ague-fit, which returned every other day twice more.

From the 17th to the 26th, the ague being ſtopt, he began to alter much for the better, two impoſthumations on the *ſcrotum* being in this interim opened.

By *Feb.* 2. the pain was quite gone, the tumour very much ſunk, and the induration ſoftened.

In a very few days after, the wound cicatriſed; and on *Feb.* 24. I left him in perfect health, and free from any complaint.

Having in the preceding caſes been ſeemingly threatened with the death of the patients, I tried the following experiment, upon the reputation of its having been done with ſucceſs by others.

CASE IV.

A. D. aged forty-two, had for near four years been troubled with a *hydrocele* on one ſide, for which had tapped him about twelve times, taking away near a pint of clear water each operation.

Jan. 3. 1736-7, after having emptied the *tunica vaginalis*, I injected an ounce of ſpirit of wine. In the inſtant, he complained of great pain, which continued to increaſe, and the next day the teguments were very much augmented in their bulk and thickneſs.

Jan. 7th, the tenſion became violently painful;

painful; and perceiving a fluctuation, I made a puncture, by which he voided about half a pint of water very deeply tinged with blood, but without any flavour of the ſpirits to be diſtinguiſhed by the ſmell. This gave him ſome eaſe: but the inflammation and thickneſs continued a whole month, and then terminated in two abſceſſes on the fore-part of the *ſcrotum*, which I opened the 7th of *February* following; and on their diſcharge, the whole tumour ſubſided, leaving a firm cicatrix and abſolute cure of that diſorder.

Something ſimilar to the circumſtance of *A. D.*'s bloody water, is the caſe of another perſon who was under my care. He had at conſiderable intervals of time been often tapped, diſcharging that ſort of ſerous water the *tunica vaginalis* for the moſt part yields: at laſt, it became tinged with blood, and every time grew more bloody than the other. The fourth diſcharge of this kind was attended with a remarkable hæmorrhage, and terminated in an abſolute cure; no ſigns of a relapſe appearing ſome months after, as I had an opportunity to inform myſelf.

To the caſes above recited, I could add ſtill more that have fallen within my knowledge, ſince the time I made theſe obſervations: particularly two, attended with inflammation and abſceſs, from the mere puncture of the lancet; both of which terminated in an abſolute

ſolute cure. It may be remarked however of theſe two, that one was attended with a thickened tunic, and the water bloody; and in the other, the coat was thickened, and the *epididymis* enlarged and indurated from a former gonorrhœa.

I would not, however, be undeſtood, from this catalogue of misfortunes, that the operation is never performed without much trouble: ſome examples I have known in its favour; but by no means enough to warrant the recommendation of it, unleſs to ſuch patients who are inconſolable under the diſtemper, and are willing to ſuſtain any thing for a cure.

It is worth obſerving, that, upon examination of the ſeveral *hydroceles*, it appeared evidently their cure was wrought by an univerſal adheſion of the teſticle to the *tunica vaginalis*, and again of that coat to the parts enveloping it; from which obſervation it will not be difficult to conceive how it happens that diſcharges of bloody water work a cure, ſince inflammations of membranes almoſt perpetually produce adheſions of the neighbouring parts, and theſe diſcharges are no other than a mixture of blood with the water from the ruptured veſſels of the inflamed tunic.

It has been ſuggeſted, that probably the expoſing the *tunica vaginalis* to the air might occaſion

occaſion the above mentioned diſorders. But beſides that the caſe of the injected *ſp. vin.* the caſe of the cauſtic, and the two punctures, are ſufficient anſwers to that opinion, the inſtances I have ſeen of the whole *ſcrotum* ſeparating in a gangrene from the *tunica vaginalis*, and leaving it naked a great many days without any ill effect, put it out of diſpute, that it is the mere inflammation of the tunic produces the danger. I have caſtrated ſeveral men, whoſe ſcirrhous teſticles were accompanied with a *hydrocele;* but the whole *tunica vaginalis* being carried off by the operation, they all recovered without any bad ſymptoms. I have here propoſed an inciſion only thro' the *tunica vaginalis* as the means to effect a radical cure; but it has been ſaid, that to cut off a large portion of it, is a more effectual and a leſs dangerous operation. This fact I have lately taken under conſideration; but have not yet had ſufficient experience to form a poſitive opinion on the ſubject.

I ſhall finiſh this chapter with a farther remark on the ſuppoſed variety of *hydroceles.* Beſides the imaginary one already ſpecified between the *ſcrotum* and inferior membranes, there is mention made of a ſpecies of dropſy between the *cremaſter muſcle* and *tunica vaginalis:* but I judge it more likely to be within ſide the *tunica vaginalis* of the cord, which adhering in different places to the ſpermatic veſſels,

veſſels, may form a cyſt or two between the adheſions, of which an inſtance has fallen under my own examination. Indeed, if we reflect on the cauſe of a dropſy of this part, we muſt neceſſarily confine it to the inſide of the membrane, where only is that order of veſſels which are the ſubject of the diſeaſe. The dropſy of the *teſtis* itſelf, is the laſt ſuppoſed ſpecies: but it is what I have never ſeen; and from the analogy of the *teſtis* to the ſtructure of other glands that are not pretended to become dropſical, I am ſuſpicious there is no ſuch diſtemper.

CHAP. X.

Of CASTRATION.

THIS is one of the moſt melancholy operations in the practice of Surgery, ſince it ſeldom takes place but in diſorders into which the patient is very apt to relapſe, *viz.* thoſe of a ſcirrhus, or cancer: for under moſt of the ſymptoms deſcribed as rendering it neceſſary, it is abſolutely improper; ſuch as a *hydrocele*, abſceſs of the *teſtis*, an increaſing mortification, or what is ſometimes underſtood by a *ſarcocele*; of which laſt it may not be amiſs to ſay a word. In the utmoſt latitude of the meaning of this term, it is received as a fleſhy ſwelling of the teſticle itſelf,

called likewiſe *hernia carnoſa;* or in ſome enlargements, ſuch as in a clap, more frequently *hernia humoralis*; but, generally ſpeaking, is conſidered as a fleſhy excreſcence formed on the body of the *teſtis*, which, becoming exceedingly hard and tumefied, for the moſt is ſuppoſed to demand extirpation, either by cutting or burning away the induration, or amputating the teſticle: but this maxim, too precipitately received, has, I apprehend, very much miſguided the practitioners of Surgery.

In order to conceive better of the diſtinction I am going to make, it muſt be remembered, that what is called the teſticle, is really compoſed of two different parts; one glandular, which is the body of the *teſtis* itſelf; and one vaſcular or membranous, known by the name of *epididymis*, which is the beginning of the *vas deferens*, or the collection of the excretory ducts of the gland.

Now it ſometimes happens that this part is tumefied, independent of the teſticle; and, feeling like a large adventitious excreſcence, anſwers very well to the idea moſt ſurgeons form of a *ſarcocele:* but, not being aware of the different nature and texture of the *epididymis*, they have frequently confounded its diſorders with thoſe of the teſticle itſelf, and equally recommended extirpation in the induration of one and the other. But without tiring the reader with particular hiſtories of caſes

caſes relating to this ſubject, I ſhall only ſay, that, from diligent inquiry, I have collected, that all indurations of the glandular part of the teſticle not tending to inflammation and abſceſs, generally, if not always, lead on to ſcirrhus and cancer; whereas thoſe of the *epididymis* ſeldom or never do. It is true, in ſpite of internal or external means, theſe laſt often retain their hardneſs, and ſometimes ſuppurate; but, however, without much dan- in either caſe.

It will not be hard to account for this difference of conſequences, from tumours of ſeemingly one and the ſame body, when we reflect how much it is the nature of cancerous poiſons to fix upon glands, and how different the *epididymis* is from a gland, tho' ſo nearly in the neighbourhood of one.

I would not have it ſuppoſed from what I have ſaid, that the *epididymis* never becomes cancerous; I confeſs it may, ſo may every part of the human body: but I advance, that it rarely or never is ſo, but from an affection of the glandular part of the teſticle firſt, which indeed ſeldom fails to taint, and by degrees to confound it in ſuch a manner, as to make one maſs of the two.

Before we caſtrate, it is laid down as a rule to inquire whether the patient has any pain in his back; and in that caſe to reject the operation, upon the reaſonable preſumption of

the ſpermatic veſſels being likewiſe diſeaſed: but we are not to be too haſty in this determination; for the mere weight of the tumour ſtretching the cord, will ſometimes create the complaint. To learn the cauſe, then, of this pain in the back, when the ſpermatic cord is not thickened, let your patient be kept in bed, and ſuſpend his *ſcrotum* in a bag-truſs, which will relieve him, if diſordered by the weight only; but if the ſpermatic cord is not thickened or indurated, which diſeaſe, when attended with a dilatation of the veſſels of the *ſcrotum*, is known by the *Greek* appellations *circocele* and *varicocele*, the caſe is deſperate, and not to be undertaken.

But ſuppoſing no obſtacle in the way to the operation, the method of doing it may be this: Lay your patient on a ſquare table of about three feet four inches high, letting his legs hang down, which, as well as the reſt of his body, muſt be held firm by the aſſiſtants. Then with a knife begin your wound above the rings of the *abdominal* muſcles, that you may have room afterwards to tie the veſſels, ſince for want of this caution operators will neceſſarily be embarraſſed in making the ligature: then carrying it thro' the *membrana adipoſa*, it moſt be continued downward, the length of it being in proportion to the ſize of the teſticle. If it is very ſmall, it may be diſſected away without taking any part of the *ſcrotum*;

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ſcrotum; but I am not very fond of this method, becauſe ſo much looſe flabby ſkin is apt to form abſceſſes afterwards, and very frequently grow callous. If the teſticle, for inſtance, weighs twenty ounces; having made one inciſion about five inches long a little circularly, begin a ſecond in the ſame point as the firſt, bringing it with an oppoſite ſweep, to meet the other in the inferior part, in ſuch a manner as to cut out the ſhape of an oval, whoſe ſmalleſt diameter ſhall be two inches: After this, diſſect away the body of the tumour with the piece of ſkin on it from the *ſcrotum*, firſt taking up ſome of the blood-veſſels if the hæmorrhage is dangerous. Then paſs a ligature round the cord, pretty near the *abdomen;* and, if you have ſpace between the ligature and teſticle, a ſecond about half an inch lower, to make the ſtoppage of blood ſtill more ſecure. The ligatures may be tied with what is called the *ſurgeon's knot*, where the thread is paſſed thro' the ring twice. This done, cut off the teſticle a little underneath the ſecond ligature, and paſs a needle from the ſkin at the lower part of the wound thro' the ſkin at the upper part, in ſuch manner as to evelope in ſome degree the ſound teſticle, which will greatly facilitate and quicken the cure; or if one ſtitch will not anſwer the purpoſe, you may repeat it in ſuch part of the

wound where the ſkin on each ſide lies moſt looſe.

The method I have here deſcribed is what I have moſt frequently practiſed: but I think I have of late years performed the operation with more dexterity, where I have divided the teſticle from the cord, before I had diſſected away the ſkin from the body of the teſticle; for having had by this means an opportunity of laying hold of its upper part, I could ſeparate it from the *ſcrotum* with much more eaſe than without that advantage.

I once caſtrated a man whoſe teſticle weighed above three pounds, where ſome of the veſſels were ſo exceedingly varicous and dilated, as nearly to equal the ſize of the humeral artery: however, I took up two or three of the moſt conſiderable, and purſued the operation, cutting away near three fourths of the ſkin; by which means I avoided a dangerous effuſion, as by dividing the veſſels before they were much ramified I had fewer ligatures to make. The ſucceſs anſwered the deſign, and the patient ſurvived the operation and healing of the wound; but the cancerous humour falling on his liver ſome time after, deſtroyed him. In large tumours, ſuch as the laſt I have mentioned, it is adviſeable to cut away great part of the ſkin: for beſides that the hæmorrhage will be much leſs in this caſe, and the operation greatly ſhortened; the ſkin, by the great diſtenſion

diſtenſion having been rendered very thin, will great part of it, if not taken away, ſphacelate, and the reſt be more prone to degenerate into a cancerous ulcer.

It may be obſerved, I do not, in order to avoid wounding the ſpermatic veſſels, recommend pinching up the ſkin before the inciſion, and afterwards thruſting the fingers between the *membrana cellularis* and the teſticle, to tear the one from the other: the firſt is not dextrous, and the other is painful; and both of them, in my opinion, are calculated to prevent what there is little or no danger of.

CHAP XI.

Of the PHYMOSIS.

THE *phymoſis* ſignifies no more than ſuch a ſtraitneſs of the prepuce, that the glans cannot be denuded; which if it becomes troubleſome ſo as to prevent the egreſs of the urine, or conceal under it chancres or foul ulcers quite out of the reach of application, is to be cut open. It ſometimes appears, that children are born imperforate; in which caſe, a ſmall puncture, dreſſed afterwards with a tent, effects a cure. But this operation is chiefly practiſed in venereal caſes, in order to expoſe chancres, either on the glans or withinſide the prepuce itſelf. And here, if the pre-

puce is not very callous and thick, a mere inciſion will anſwer; which may be made either with the ſciſſars, or by ſlipping a knife between the ſkin and glands to the very extremity, and cutting it up. The laſt method is more eaſy than that of the ſciſſars: but it is ſafer to make the wound on one ſide the prepuce than upon the upper part; for I have ſometimes ſeen the great veſſels on the *dorſum penis* afford a terrible hæmorrhage, which may be avoided by following this rule; tho' the prepuce remains better ſhaped after an inciſion made in the upper part, and therefore is to be preferred by thoſe who underſtand how to take up the veſſels. In children it ſometimes happens that the prepuce becomes very much contracted; and in that caſe it is accidentally ſubject to ſlight inflammations, which bring on ſome ſymptoms of the ſtone: but the diſorder is always removed by the cure of the *phymoſis*.

If the prepuce be very large and indurated, the opening alone will not ſuffice; and it is more adviſeable to take away the calloſity by circumciſion, which muſt be performed with a knife; and if the artery bleed much, it muſt be taken up with a ſmall needle and ligature. It may be worth remarking here, that in certain *phymoſes* the prepuce becomes ſo thickened, and at the ſame time ſo elongated, that it reſembles the body of the *penis*, and

and has led ſome into the miſtake of ſuppoſing they had cut off a portion of the *penis* itſelf, when it was only a monſtrous *phymoſis*.

CHAP XII.

Of the PARAPHYMOSIS.

THE *paraphymoſis* is a diſeaſe of the *penis*, where the prepuce is fallen back from the glans, and cannot be brought forwards to cover it. There are many whoſe *penis* is naturally thus formed, but without any inconvenience; ſo that ſince the time of the *Romans* (ſome of whom thought it indecent to have the glans bare) it has not been uſual, as I can find, to perform any operation upon that account; but we read the ſeveral proceſſes of it deſcribed very particularly by *Celſus*, who does not ſpeak of it as an uncommon thing. Moſt of the inſtances of this diſtemper are owing to a venereal cauſe: but there are ſome, where the prepuce is naturally very tight, which take their riſe from a ſudden retraction of it, and immediate enlargement of the glans preventing its return. Sometimes it happens that the ſurgeon ſucceeds in the reduction immediately, by compreſſing the the extremity of the *penis*, at the time he is endeavouring to advance the prepuce. If he does not, let him keep it ſuſpended, and attempt

tempt again, after having fomented, and uſed ſome emollient applications: but if, from the contraction below the *corona glandis*, there is ſo great a ſtricture as to threaten a gangrene, or even if the *penis* is much enlarged by water in the *membrana reticularis* forming tumours called *cryſtallines*, three or four ſmall inciſions muſt be made with the point of a lancet into the ſtricture and *cryſtallines*, according to the direction of the *penis*; which in the firſt caſe will ſet free the obſtruction, and in the other evacuate the water. The manner of dreſſing afterwards muſt be with fomentations, digeſtives, and the *theriaca Londinenſis* over the pledgets.

CHAP. XIII.

Of the PARACENTESIS.

THIS operation is an opening made into the *abdomen*, in order to empty any quantity of extravaſated water collected in that ſpecies of dropſy called the *aſcites*; but as there is much more difficulty in learnirg when to perform than how to perform it, and indeed in ſome inſtances requires the niceſt judgement, I ſhall endeavour to ſpecify the diſtinctions which render the undertaking more or leſs proper.

There are but two kinds of dropſy; the *anaſarca*,

anaſarca, called alſo *leucophlegmacy*, when the extravaſated water ſwims in the cells of the *membrana adipoſa;* and the *aſcites*, when the water poſſeſſes the cavity of the *abdomen*: in the firſt kind, the water is clear and limpid; but in the ſecond, a little groſſer, very gelatinous and corrupted, and ſometimes even mixed with fleſhy concretions. I do not mention the *tympany*, or flatulent dropſy of the *abdomen:* nor have I in the chapter of *Hernias* ſpoken of the *hernia ventoſa*, it being certain that the *aſcites* and *bubonocele* have generally been miſtaken for thoſe diſeaſes; tho' there are ſome few inſtances where an enormous tumour of the *abdomen* ariſes from exceſſive flatulencies and diſtenſions of the inteſtines.

It is of no great conſequence in the practice of Phyſic or Surgery, whether the water is diſcharged by a rupture of the lymphatics, or a tranſudation thro' the pores of their relaxed coats, ſince the fact is eſtabliſhed, that they have a power ſometimes of abſorbing the fluid lying thus looſe, and conveying it into the courſe of the circulation; after which, it is often totally carried off by ſome emunctory of the body. The great diſpoſition there is in nature to fix upon the kidneys and glands of the inteſtines for this end, has put phyſicians upon promoting it by cathartics and diuretics, which ſometimes entirely carry off the diſtemper. If one any ſhould doubt of the

the poſſibility of a cure when the water is extravaſated, let him inject, thro' a ſmall opening into the *thorax* or *abdomen* of a dog, a pint of warm water; and, upon diſſection ſome few hours after, he ſhall not find one drop left there: which puts out of diſpute this power of abſorption. But indeed, tho' we do not much attend to it, it is by this very act the circulation is carried on regularly with reſpect to ſome if not all the ſecretions, which would overload their receptacles if they were not thus taken up again. The example ſerving for illuſtration, may be the circulation of the aqueous humour of the eye, which no one queſtions is an extravaſated fluid.

The operation of tapping is ſeldom the cure of the diſtemper. But dropſies, which are the conſequence of a mere impoveriſhment of the blood, are leſs likely to return than thoſe which are owing to any previous diſorder of the liver: and it is not uncommon for dropſies that follow agues, hæmorrhages, and diarrhœas, to do well; whereas in ſuch as are complicated with a ſcirrhous liver, there is hardly an example of a cure.

The water floating in the belly is, by its fluctuation, to determine whether the operation be adviſeable. For if, by laying one hand on any part of the *abdomen*, you cannot feel an undulation from ſtriking on an oppoſite part with the other, it is to be preſumed there

there will be ſome obſtacle to the evacuation. It ſometimes happens, that a great quantity, or almoſt all the water, is contained in little bladders, adhering to the liver and the ſurface of the *peritonæum*, known by the name of *hydatids*; and the reſt of it in different ſized ones, from the degree of a *hydatid* to the ſize of a globe holding half a pint or a pint of water. This is called the *encyſted* dropſy; and, from the ſmallneſs of its cyſts, makes the operation uſeleſs; but is not difficult to be diſtinguiſhed, becauſe there is not a fluctuation of the water, unleſs it is complicated with an extravaſation.

When the fluctuation is hardly perceptible (except the teguments of the *abdomen* are very much thickened by an *anaſarca*), in all probability the fluid is gelatinous: I have had inſtances where it was too viſcid to paſs thro' a common trocar; on which account it is proper to be furniſhed with a couple, of the ſize deſcribed in the copperplate. I once tapped a perſon, when the fluid would not paſs even thro' the large one; ſo, to eaſe him from the diſtention he laboured under, I dilated the orifice with a large ſponge-tent, and afterwards extracted a prodigious quantity of diſtinct concreted *hydatids*, differing in nothing, as I could diſcover, from the nature of a *polypus* formed in the noſe.

There is another kind of dropſy, which for the

the moſt part forbids the operation, and is peculiar to women, being ſeated in the body of one or both ovaries. There is, I believe, no example of this ſpecies but what may be known by the hardneſs and irregularity of the tumour of the *abdomen*, which is nearly uniform in the other caſes.

When the ovary is dropſical, the water is generally depoſited in a great number of cells formed in the body of it; which circumſtance makes the fluctuation inſenſible, and the perforation uſeleſs: tho' ſometimes there are only one or two cells; in which caſe, if the ovary is greatly magnified, the undulation will be readily felt, and the operation be adviſeable. I once tapped a gentlewoman in this circumſtance, whoſe ovary, upon the puncture, yielded but half a pint of water; but being ſtill perſuaded, by the feel, that there was a large cyſt, I tapped her in another part, and drew away near a gallon. I had an opportunity, after her death, to be convinced of this fact, by examining the body.

When the *aſcites* and *anaſarca* are complicated, it is ſeldom proper to perform the operation, ſince the water may be much more effectually evacuated by ſcarifications in the legs than by tapping.

Upon the ſuppoſition nothing forbids the extraction of the water, the manner of operating is this: Having placed the patient in a chair

chair of a convenient height, let him join his hands ſo as to preſs upon his ſtomach: then dipping the trocar in oil, you ſtab it ſuddenly through the teguments, and, withdrawing the perforator, leave the waters to empty by the canula. The *abdomen* being, when filled, in the circumſtance of a bladder diſtended with a fluid, would make it indifferent where to wound; but the apprehenſion of hurting the liver, if it be much enlarged, has induced operators rather to chooſe the left ſide, and generally in that part which is about three inches obliquely below the navel. If the navel protuberates, you may make a ſmall puncture with a lancet through the ſkin; and the waters will be readily voided by that orifice, without any danger of a *hernia* ſucceeding, as is apprehended by many writers: though it ſhould be carefully attended to, whether the protuberance is formed by the water or an *exomphalos;* in which latter caſe the inteſtine would be wounded, and not without the greateſt danger. The ſurgeon, neither in opening with the lancet, nor perforating with the trocar, need fear injuring the inteſtines, unleſs there is but little water in the *abdomen*, ſince they are too much confined by the meſentery to come within the reach of danger from theſe inſtruments; but it ſometimes happens, that when the water is almoſt all emptied, it is ſuddenly ſtopped by the inteſtine or *omentum*

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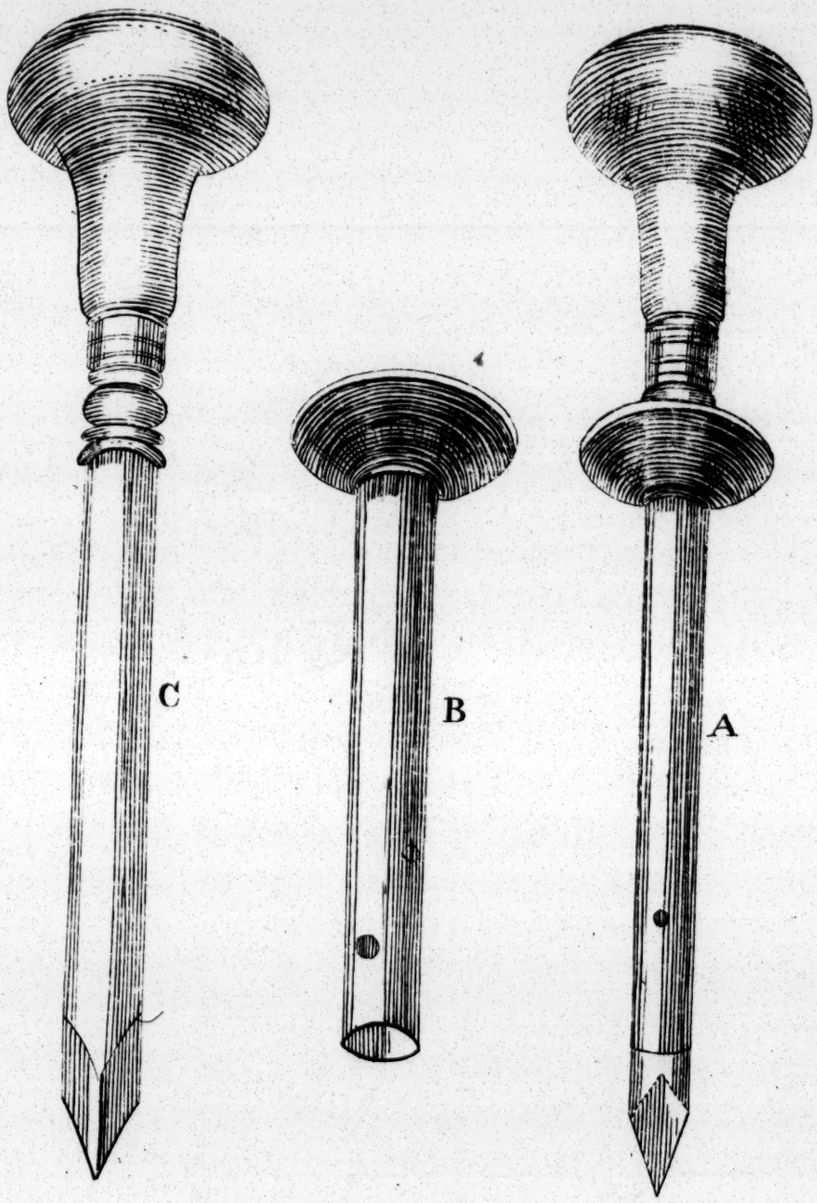
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preſſing againſt the end of the canula; in which caſe you may puſh them away with a probe. During the evacuation, your aſſiſtants muſt keep preſſing on each ſide of the *abdomen*, with a force equal to that of the waters before contained there: for by neglecting this rule, the patient will be apt to fall into faintings, from the weight on the great veſſels of the *abdomen* being taken off, and the ſinking of the diaphragm ſucceeding; in conſequence of which, more blood flowing into the inferior veſſels than uſual, leaves the ſuperior ones of a ſudden too empty, and thus interrupts the regular progreſs of the circulation. To obviate this inconvenience, the compreſſion muſt not only be made with the hands during the operation, but be afterwards continued, by ſwathing the *abdomen* with a roller of flannel about eight yards long and five inches broad, beginning at the bottom of the belly, ſo that the inteſtines may be borne up againſt the diaphragm. You may change the roller every day, till the third or fourth day, by which time, the ſeveral parts will have acquired their due tone. For the dreſſing, a piece of dry lint and plaſter will ſuffice; but between the ſkin and roller it may be proper to lay a double flannel a foot ſquare, dipt in brandy or ſpirits of wine.

This operations though it does not often abſolutely

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abſolutely cure, yet it ſometimes preſerves life a great many years, and even a pleaſant one, eſpecially if the waters have been long collecting. I have known ſeveral inſtances of people being tapped once a month, for many years, who felt no diſorder in the intervals, till towards the time of the operation, when the diſtention grew painful; and there are inſtances, where the patient has not relapſed after it. Upon the whole, there is ſo little pain or danger in the operation, that, in conſideration of the great benefits ſometimes received from it, I cannot but recommend it as exceedingly uſeful.

PLATE III.

The EXPLANATION.

A. A trocar of the moſt convenient ſize for emptying the *abdomen*, when the water is not gelatinous. It is here repreſented with the perforator in the canula, juſt as it is placed when we perform the operation.

B. The canula of a large trocar, which I have recommended in caſes where the water is gelatinous.

C. The perforator of the large trocar.

The handle of the trocar is generally made of wood, the canula of ſilver, and the perforator of ſteel; great care ſhould be taken by the makers of this inſtrument, that the

perforator ſhould exactly fill up the cavity of the canula; for unleſs the extremity of the canula lies quite cloſe and ſmooth on the perforator, the introduction of it into the *abdomen* will be very painful. To make it ſlip in more eaſily, the edge of the extremity of the canula ſhould be thin and ſharp: and I would recommend, that the canula be ſteel; for the ſilver one, being of too ſoft a metal, becomes jagged or bruiſed at its extremity with very little uſe. After the operation, the canula muſt be wiped clean and dry, by drawing a ſlip or two of flannel thro' it; otherwiſe when the perforator is put into it, they will both grow ruſty.

CHAP. XIV.

Of the FISTULA IN ANO.

THE *fiſtula in ano*, without any regard to the ſtrict definition of the word, is generally underſtood to be an abſceſs running upon or into the *inteſtinum rectum;* though an abſceſs in this part, when once ruptured, does generally, if neglected, grow callous in its cavity and edges, and becomes at laſt what is properly called a *fiſtula.*

That the *anus* is ſo often expoſed to this malady, in any criſis of the conſtitution, is chiefly aſcribed to the depending ſituation of the part: but what very much conduce to it likewiſe,

likewiſe, are the great quantities of fat ſurrounding the *rectum*, and the preſſure the hæmorrhoidal veſſels are liable to, which, being ſuſtained upon very looſe membranes, will be leſs able to reſiſt any effort that nature ſhall exert to fling off a ſurcharge; and from one ſtep to another, that is, from inflammation to ſuppuration, lead on to the diſtemper we are treating of. That the fat is the proper ſubject of abſceſſes, may be learned from an inflammation of the ſkin affecting the *membrana adipoſa*, and producing matter there; in which caſe, a ſuppuration frequently runs from cell to cell, and in a few days lays bare a great quantity of fleſh underneath, without affecting the fleſh itſelf: Nay, I think it may be doubted, whether, in thoſe abſceſſes which are eſteemed ſuppurations of the muſcles, the inflammation and matter are not abſolutely firſt formed in this membrane, where it is inſinuated in the interſtices of their fibres.

The piles, which are little tumours formed about the verge of the *anus*, immediately within the *membrana interna* of the *rectum*, do ſometimes ſuppurate, and become the forerunners of a large abſceſs; alſo external injuries here, as in every other part of the body, may produce it: but from whatever cauſe the abſceſs ariſe, the manner of operating upon it will be according to the nature and direction of its cavity. If

If the ſurgeon have the firſt management of the abſceſs, and there appear an external inflammation upon one ſide of the buttock only; after having waited for the proper maturity, let him with a knife make an inciſion the whole length of it; and in all probability, even though the bladder be affected, the largeneſs of the wound, and the proper application of doſſils lightly preſſed in, will prevent the putrefaction of the inteſtine, and make the cavity fill up like impoſthumations of other parts.

If the *ſinus* be continued to the other buttock, almoſt ſurrounding the inteſtine, the whole courſe of it muſt be dilated in like manner; ſince in ſuch ſpongy cavities a generation of fleſh cannot be procured but by large openings; whence alſo, if the ſkin is very thin, lying looſe and flabby over the *ſinus*, it is abſolutely neceſſary to cut it quite away, or the patient will be apt to ſink under the diſcharge, which in the circumſtance here deſcribed is ſometimes exceſſive. By this method, which cannot be too much recommended, it is amazing how happy the event is likely to be; whereas from neglecting it, and truſting only to a narrow opening, if the diſcharge do not deſtroy the patient, at leaſt the matter, by being confined, corrupts the gut, and, inſinuating itſelf about it, forms many other channels, which, running in various directions, often baffle an operator, and have been the cauſe

of

of a fiſtula being ſo generally eſteemed very difficult of cure.

Here I have conſidered the impoſthumation as poſſeſſing a great part of the buttock; but it more frequently happens, that the matter points with a ſmall extent of inflammation on the ſkin, and the direction of the *ſinus* is even with the gut. In this caſe, having made a puncture, you may with a probe learn if it has penetrated into the inteſtine, by paſſing your finger up it, and feeling the probe introduced through the wound into its cavity; though, for the moſt part, it may be known by a diſcharge of matter from the *anus*. When this is the ſtate of the fiſtula, there is no heſitation to be made; but immediately putting one blade of the ſciſſars up the gut, and the other up the wound, ſnip the whole length of it. This proceſs is as adviſable when the inteſtine is not perforated, if the *ſinus* is narrow, and runs upon or very near it: for if the abſceſs be tented, which is the only way of dreſſing it while the external orifice is ſmall, as I have here ſuppoſed, it will almoſt certainly grow callous; ſo that the ſureſt means of cure will be opening the gut, that proper applications may be laid to the bottom of the wound. However, it ſhould be well attended to, that ſome *ſinuſes* pretty near the inteſtine neither run into nor upon it; in which caſe they muſt be opened, according

to the courſe of their penetration. There are abundance of inſtances, where the inteſtine is ſo much ulcerated, as to give free iſſue to the matter of the abſceſs by the *anus*. But I believe there are none where there is not by the thinneſs and diſcolouration of the ſkin, or an induration to be perceived thro' the ſkin, ſome mark of its direction; which, if diſcovered, may be opened into with a lancet, and then it becomes the ſame caſe as if the matter had fairly pointed.

If the *ſinuſes* into and about the gut are not complicated with an induration, and you can follow their courſe, the mere opening with ſciſſars, or a knife guided on a director, will ſometimes ſuffice: but it is generally ſafer to cut the piece of fleſh, ſurrounded by theſe inciſions, quite away; and, when it is callous, abſolutely neceſſary, or the calloſities muſt be waſted afterwards by eſcharotic medicines, which is a tedious and cruel method of cure.

When the fiſtula is of long ſtanding, and we have choice of time for opening it, a doſe of rhubarb the day before the operation will will be very convenient, as it not only will empty the bowels, but alſo prove an aſtringent for a while, and prevent the miſchief of removing the dreſſings in order to go to ſtool.

It ſometimes happens that the orifices are ſo ſmall, as not to admit the entrance of the

ſciſſars

ſciſſars; in which caſe, ſponge-tents muſt be employed for their dilatation.

In performing theſe operations on the *anus*, I do not think in general any inſtrument ſo handy as the knife and ſciſſars; almoſt all the others which have been invented to facilitate the work, are not only difficult to manage, but more painful to the patient. However, in thoſe inſtances where the fiſtula is very narrow, and opens into the inteſtines, juſt within the verge of the *anus*, the ſyringotomy may be uſed with advantage; but where the opening into the gut is high, it cannot be employed without giving great pain. I do not caution againſt cutting the whole length of the ſphincter, experience having ſhown it may be done with little danger of an incontinence of excrement; and in fact the muſcle is ſo ſhort, that it muſt generally be cut through in dilatations of the inteſtine.

The worſt ſpecies of fiſtula is that communicating with the *urethra*, and ſometimes (thro' the proſtate gland) with the bladder itſelf. This generally takes its riſe from a former gonorrhœa; and appears externally firſt *in perinæo*, and afterwards increaſing more towards the *anus*, and even ſometimes into the groin, burſts out in various orifices, thro' the ſkin, which ſoon becomes callous and rotten; and the urine, paſſing partly through theſe orifices, will often excite as much pain,

and of the ſame kind, as a ſtone in the bladder.

This ſpecies of fiſtula, taking its riſe from ſtrictures of the urethra, is only manageable by the bougie. For ſo long as the *urethra* is obſtructed, the cure of the fiſtula will be imperfect: but if the canal be opened by this application, it is amazing what obſtinate indurations and foul *ſinuſes* will in conſequence diſappear; tho' there are ſome ſo callous and rotten, as to demand the knife and ſkilful dreſſings, notwithſtanding the *urethra* ſhould be dilated by the uſe of bougies.

CHAP. XV.

Of the Puncture *of the* PERINÆUM.

THIS operation is performed when the bladder is under ſuch a ſuppreſſion of urine as cannot be relieved by any gentler methods, nor, by reaſon of the obſtruction in its neck, or the *urethra*, will admit of the introduction of the catheter. The manner of doing it, as deſcribed by moſt writers, is by puſhing a common trocar, from the place where the external wound in the old way of cutting is made, into the cavity of the bladder, and ſo procuring the iſſue of the water through the canula; but others, refining upon this practice, have ordered an inciſion to be

be carried on from the ſame part into the bladder, and then to inſinuate the canula. But, in my opinion, both the methods are to be rejected, in favour of an opening a little above the *os pubis*: for beſides that it is not eaſy to guide the inſtrument thro' the proſtate gland into the bladder, the neceſſity of continuing it, in a part already very much inflamed and thickened, ſeldom fails to do miſchief, and even to produce a mortification.

Some time ſince, a Gentlewoman complained of a difficulty in making water, which ſhe voided by drops with exceſſive pain; and ſoon after, the urinary paſſage became totally obſtructed. Having in vain attempted to paſs the ſmalleſt catheter I could get, I introduced my finger into the *vagina*, and felt a very hard tumour about the neck of the bladder. The patient had not voided any water for five days; and being in the utmoſt agony, and as we judged within a few hours of dying, I put in practice the inciſion above the *os pubis*, making the wound of the ſkin about two inches long, and that of the bladder about half an inch. Having emptied, by this means, a prodigious quantity of water, I kept the orifice open with a hollow tent, till ſuch time as the tumour ſubſided, which, with proper medicines, it did by degrees; and in about ſix weeks all her water came the right way, and ſome time after ſhe recovered perfect

fect health. I have lately practiſed a method ſtill more eaſy both to the patient and the operator; which conſiſts only in emptying the bladder with a common trocar, and ſtopping the canula with a little cork, which is afterwards to be taken out as often as the patient has occaſion to urine. The canula is to be continued in the bladder, till ſuch time as the perſon finds he can void his urine by the natural paſſage.

In this operation the *abdomen* ought to be perforated above two inches above the *os pubis;* and if the patient be fat, the trocar ſhould penetrate two inches, otherwiſe an inch and a half will be ſufficient. This precaution is of great importance; for I have ſeen an example, where the trocar being introduced nearer to the *os pubis*, the extremity of it preſſed upon the lower portion of the bladder, and in a few days made a paſſage into the *rectum*.

CHAP. XVI.

Of the STONE.

STONY concretions are a diſeaſe incident to ſeveral parts of the body; but I ſhall treat only of thoſe formed in the kidneys and bladder. Hitherto there never has been given any ſatisfactory account of the cauſes of this concreting

concreting diſpoſition in the fluids; and tho' there may be ſome propriety in conſidering the ſand of urine in the ſame light as the tartar of wine, from their ſimilitude in ſeveral experiments, yet we cannot infer from thence, what does immediately produce it. At leaſt, it is not with any certainty to be imputed to a particular diet or climate, which however are the cauſes commonly aſſigned; ſince we ſee that in all countries, and amongſt all ranks of people, as much among the ſober as the luxurious, the ſtone is a frequent diſtemper: and though the great numbers cut at the hoſpitals of *Paris*, where the water of the *Seine* is ſo remarkable for its quantity of ſtone, ſeems to favour the opinion of its being generated by particular fluids received into the blood; yet I believe, upon inquiry, this famous inſtance will not appear concluſive; ſince moſt of thoſe patients come from the provinces, or diſtant villages, where the water is not drunk; and as to the inhabitants of *Paris* itſelf, by what I was able to learn of the ſurgeons there, the number of thoſe afflicted with the ſtone amongſt them is pretty nearly in the ſame proportion as in *London*. From which conſiderations, and the circumſtance of ſo many more children having the ſtone than men, one would be inclined to think, the diſpoſition is much oftener born with us, than acquired by any external means. I once ſaw a ſtone in the kidney

kidney of a fœtus at the term of ſeven months growth, which, had it lived, was two months before it would have been born.

It is certain the urine generally abounds with matter proper to compoſe a ſtone; and perhaps, if it could grow cold in the bladder, it would always depoſit the matter there, as it does on the ſides of the chamber-pot, tho' the coats of the bladder being covered with a mucilage makes them more unfit than the ſides of the pot to attract the ſtony particles: but we ſee, when once a hard body is inſinuated into the bladder, it ſeldom fails to become the nucleus of a ſtone, whether it be a large piece of gravel, a needle, a bullet, or any other firm extraneous ſubſtance, even grumous blood.

From the monſtrous increaſe of ſome ſtones in a ſmall time, and the ceſſation of growth, for many years, of others, we may be perſuaded that the conſtitution varies exceedingly at different times with regard to theſe ſtony ſeparations: and, from the appearances of moſt ſtones when artfully ſawed through, we may gather, that this variation of conſtitution does not ſhow itſelf only in the quantity of gravel added to the ſtone, but the quality of it alſo: ſo that a red uniform ſtone of an inch diameter, may perhaps, at half that ſize, have been a ſmooth white one; at a quarter, a brown mulberry one; and ſo on, at different times,

times, altering in its ſpecies. Hence (from the appoſition of differently coloured gravel) ariſes for the moſt part the laminated appearance of a ſtone; though ſometimes the *laminæ* are very nearly of the ſame colour and compoſition: and in this caſe their formation ſeems to be owing to the want of accretion in the ſtone, for a certain time, during which its ſurface, by rubbing againſt the coats of the bladder, and its attrition from the ſtream of urine, becomes ſmooth and compact; ſo that, when more freſh looſe gravel adheres to it, its different denſity in that part will neceſſarily make the ſtreaks we ſee in a ſection of the ſtone, which are only the external ſurfaces of each *lamina*.

That the ceaſing to grow gives them this laminated form, and not any particular diſpoſition in ſand to ſhoot into ſuch a ſhape, is probable from the examination of ſome other ſtones, in which a great quantity of gravel is firſt collected without any nucleus, into a ſpongy uniform maſs, and, after that, is covered with ſeveral *laminæ*.

It is no wonder that ſtones ſo generally form in the kidneys, ſince the diſpoſition of the urine will naturally ſhow itſelf as ſoon as it is ſeparated into the *pelvis*: that is, the ſtony particles having as ſtrong an endeavour to unite with one another in the kidneys as the bladder, will conſequently, from meeting firſt there,

there, generally produce gravel and ſtone in that part; nay, I have found, by opening the kidneys of calculous people, that ſtone is formed even earlier than I have here ſuggeſted, for in them the *tubuli Belliniani* were full of gravel.

Small ſtones and gravel, are frequently voided without pain: but ſometimes they collect and become very large in the kidneys; in which caſe a fit of the ſtone in that part is the cure, from the inflammation and pain occaſioning convulſive twitches which at laſt expel them. But, in this diſeaſe, the patient is very much relieved by ſeveral kinds of remedies, ſuch as the mucilaginous, the ſaponaceous, *&c.* ſome of which lubricate, and others both lubricate and ſtimulate. The ſand, in paſſing through the *ureters*, is very much forwarded by the force of the urine; which is ſo conſiderable, that I have ſeen a ſtone that was obſtructed in the *ureter* in its firſt formation, perforated quite through its whole length, and form a large channel for the ſtream of urine. The *ureters* being very narrow as they run over the *pſoas* muſcle, and alſo at their entrance into the bladder, make the movement of the ſtone very painful and difficult in thoſe parts: but there is ſeldom ſo much trouble after the firſt fit; for when once they have been dilated, they generally continue ſo. I have often ſeen them as big as a man's finger, but they have been found much larger.

When

When once a ſtone has acquired a moderate ſize in the bladder, it uſually occaſions the following complaints: Frequent inclination to make water, exceſſive pain in voiding it drop by drop, and ſometimes a ſudden ſtoppage of it if diſcharged in a ſtream; after urining, great torture in the *glans penis*, which laſts one, two, or three minutes; and in moſt conſtitutions, the violent ſtraining makes the *rectum* contract and expel its excrements; or if it be empty, occaſions a *teneſmus*, which is ſometimes accompanied with a *prolapſus ani*. The urine is often tinctured with blood from a rupture of the veſſels, and ſometimes pure blood itſelf is diſcharged; ſometimes the urine is very clear; but frequently there are great quantities of ſlimy ſediment depoſited at the bottom of it, which is no other than a preternatural ſeparation of the mucilage of the bladder, but has been often miſtaken for *pus*; whence has ariſen an opinion, that ulcers of the bladder are common, tho' in fact the diſtemper is very rare.

Theſe are the ſymptoms of the ſtone in the bladder: yet by no means are they infallible; ſince a ſtone in the *ureter* or kidneys, or an inflammation of the bladder from any other cauſe, will ſometimes produce the ſame effects. But if the patient cannot urine except in a certain poſture, it is almoſt a ſure ſign the orifice is obſtructed by a ſtone: if he finds

eaſe

eaſe by preſſing againſt the *peritonæum* with his fingers, or ſitting with that part upon a hard body, there is little doubt to be made that the eaſe is procured by taking off the weight of the ſtone: or laſtly, if, with moſt of theſe complaints, he thinks he can feel it roll in his bladder, it is hardly poſſible to be miſtaken. However, the only ſure judgment to be formed, is from ſearching.

That we ſhould not readily diſtinguiſh the complaints of the ſtone from many other affections of the bladder, is not very ſurpriſing, when we reflect that a fit of the ſtone is nothing but an inflammation of its coats, which, tho' it be excited by the ſtone, requires a diſpoſition in the blood to produce it: for if the complaints in a fit were owing to the immediate irritation of the bladder, it ſhould follow, that, the ſtone being always the ſame, the fit would be continual; but beſides that all patients have conſiderable intervals of eaſe (often of many months) except in thoſe caſes where the ſtone is either very large or pointed, there are inſtances of ſome few happy conſtitutions, where they have no pain, even after having for a certain time ſuffered very much.

To prevent the violence and frequent returns of the fits of the ſtone, bleeding and gentle purging with manna are beneficial; abſtaining alſo from malt-liquors, and exceſs

ceſs of eating and drinking is very ſerviceable; but the milk-diet and honey are the greateſt preventatives, not only of inflammation, but perhaps ſometimes too of the farther accretion of the ſtone.

From conſidering the diſorders of the ſtone in this light, and the frequent intervals of eaſe which happen without the aſſiſtance of medicine, we cannot wonder that ſo many patients have believed the ſtone diſſolved, when they have been under any particular regimen; and that in all ages there have been many people deceived for a length of time, by a ſuppoſed diſſolvent, tho' we have not hitherto known any ſafe one, till lately that lime and ſoap have been diſcovered to have ſometimes that effect.

CHAP. XVII.

Of SEARCHING.

THE patient being laid on a horizontal table, with his thighs elevated and a little extended, paſs the ſound with the concave part towards you, till it meets with ſome reſiſtance *in perinæo*, a little above the *anus*: then turning it without much force, puſh it gently on into the bladder; and if it meets with an obſtruction at the neck, raiſe its extremity upwards, by inclining the han-

dle of it towards you; or if it does not then ſlip in, withdraw it a quarter of an inch, and, introducing your fore-finger into the *rectum*, lift it up, and it will ſeldom fail to enter. There is ſome art in turning the ſound in the proper place of the *urethra*, which ſurgeons not verſed in this operation cannot ſo well execute; therefore they may paſs the inſtrument with the concave ſide always towards the *abdomen* of the patient, obſerving the ſame rule at the entrance into the bladder as in the other method. The cauſe of this obſtacle, beſides the *rugæ* of the *urethra*, and the reſiſtance of the *verumontanum*, is ſometimes a ſmall projection of the orifice of the bladder in the *urethra*, like that of the *os tincæ* in the *vagina*, which occaſions the end of the ſound to ſlip a little beyond it.

It is not to be ſuppoſed, that, by ſearching, one can poſſibly judge of the ſize and form of a ſtone; and indeed the frequency of the fits, and violence of the ſymptoms, are a better rule to go by: though whoever ſhall think himſelf capable of diſtinguiſhing abſolutely the difference of ſtones, even by theſe circumſtances, will ſometimes be miſtaken; ſince the frequency and violence of the pain depend not always merely upon their magnitude or ſhape, and there are ſome inſtances where a ſtone of ſix grains weight has for ſeveral months given more pain in one perſon than

a much larger has in another: however, *cæteris paribus*, a large or rough ſtone is worſe than a ſmall or a ſmooth one.

Though, upon ſearching, we are aſſured of a ſtone in the bladder, we are not, without farther inquiry, to operate immediately; ſince there are ſometimes obſtacles which forbid the operation, either abſolutely, or only for a certain time. Among theſe, that of greateſt conſequence, is the gravel or ſtone in the kidneys; which is known by the pain in the loins, vomitings, contractions of the teſticles, numbneſs of the thighs, and often by matter which the inflammation produces in the kidneys. The objections of leſs weight, and which frequently are removed, are a fit of the ſtone, a cough, a hectic, and being emaciated by long pain; exceſſive hot or cold weather, are likewiſe hindrances: but, in extremity of danger, theſe laſt conſiderations may be diſregarded; tho' no doubt very hot weather is more inconvenient and dangerous than cold, as lying-abed is then more troubleſome, and the urine much ſalter.

Difference of age makes an extreme difference in danger, infants and young people almoſt always recovering; but ſtill the operation is adviſable on thoſe advanced in years, tho' it is not attended with near the ſame ſucceſs. This operation is performed four ſeveral ways, all which I ſhall deſcribe with their

particular inconveniences, that we may the more eaſily pitch upon that which has the leaſt.

Before we perform any of them, it will be proper to prepare the patient with a gentle purge the preceding day, and a clyſter early in the morning, which will be of great ſervice in cooling the body, and making ſome of the operations leſs dangerous where the *rectum* is liable to be wounded when full.

CHAP. XVIII.

Of the LESSER APPARATUS, *or cutting on the* GRIPE.

THE moſt ancient way of cutting for the ſtone, is that deſcribed by *Celſus*, and known by the name of *cutting on the gripe*; though, ſince the time of *Johannes de Romanis*, it is alſo called *cutting with the leſſer apparatus*, to diſtinguiſh it from his new method, which, on account of the many inſtruments employed in it, is called *cutting with the greater apparatus*. The manner of doing the operation is this: You firſt introduce the fore-finger and middle-finger of the left hand, dipt in oil, up the *anus*, and, preſſing ſoftly with your right hand above the *os pubis*, endeavour to bring the ſtone towards the neck of the bladder; then making

making an inciſion, on the left ſide of the *perinæum*, above the *anus*, directly upon the ſtone, you turn it out through the wound, either with your fingers or a ſcoop.

This way of cutting was attended with many difficulties, for want of proper inſtruments to direct the inciſion and extract the ſtone when it lay beyond the reach of the fingers, which in a large bladder was frequently the caſe: ſo that it is ſtrange *Celſus* confined the operation to the age between nine and fourteen, ſince it is much eaſier to be performed in infancy than at thoſe years; and it plainly appears from his account of it, that many died from the violence done to the bladder in endeavouring to bring the ſtone forwards, though the operators failed in their attempt, and the patients were not cut.

The wound of the bladder in this operation is made in the ſame place as is now practiſed in the lateral method; but its impracticability on ſome ſubjects, and uncertainty on all others, have made it univerſally exploded: ſo that nobody now makes an inciſion without the direction of a ſtaff, unleſs a ſtone entirely prevents the introduction of it, by preſſing againſt and ſtopping up the neck of the bladder; and in this caſe, when we cut directly upon the ſtone, it is much ſafer to puſh it back farther into the bladder, and lay hold of it with the forceps, than to endeavour with

the ſcoop or fingers to force it outwards, which circumſtance alone makes it different from *Celſus*'s method. It muſt be diſtinguiſhed, however, when I ſpeak of puſhing the ſtone back, that I ſuppoſe it in the neck of the bladder: for it frequently happens that it lies at the extremity of the *urethra*, on the outſide of the bladder; in which caſe the wound of the *urethra* may be made large enough to turn it out with the fingers, or the end of ſome ſlender inſtrument.

CHAP. XIX.

Of the GREATER APPARATUS, *or the* Old Way.

THIS method of cutting, invented by *Johannes de Romanis*, and publiſhed by his ſcholar *Marianus* in the year 1524, has at different times, and with different people, varied conſiderably in ſome of its proceſſes, and particularly with regard to the uſe of certain inſtruments. What I ſhall deſcribe, will be the manner in which it is now practiſed with all its improvements.

Having laid the patient on a ſquare horizontal table three feet four inches high, with a pillow under his head, let his legs and thighs be bent, and his heels made to approach his

his buttocks, by tying his hands to the bottom of his feet with a couple of ſtrong ligatures about two yards long; and to ſecure him more effectually from ſtruggling, paſs a double ligature round one of his hams, and carry the four ſtrings round his neck to the other ham; then paſſing the loop underneath it, make a knot by threading one of the ſingle ends through the loop: after this, the thighs being widened from each other, and firmly ſupported by proper perſons, you introduce the ſtaff, having firſt dipt it in oil, which muſt be held by your aſſiſtant, a little leaning on the left ſide of the ſeam *in perinæo;* and beginning the external wound juſt below the *ſcrotum* (which muſt be held out of the way), you continue it downwards to within two fingers breadth of the *anus:* then leaving that direction, you ſlip the knife forwards in the groove, pretty far into the bulbous part of the *urethra;* or, as there is ſome danger of wounding the *rectum*, in the continuation of the inciſion you may turn the knife with the back towards it, and make this part of the inciſion from within outwards. Should a very large veſſel be cut, it will be adviſable to tie it before you proceed any farther in the operation. When the wound is made, ſlide the gorget along the groove of the ſtaff into the bladder: and to do it with more ſafety, when the beak of it is received in the groove,

it will be proper to take the ſtaff yourſelf in your left hand; for if the aſſiſtant ſhould unwarily either incline the handle of it too much towards you, or not reſiſt enough to the force of the gorget, it is very apt to ſlip out of the groove, between the *rectum* and the bladder; which accident is not only inconvenient to the operator for the preſent, but is attended for the moſt part with very bad conſequences. The gorget being paſſed, dilate the *urethra* and neck of the bladder with your fore-finger, and introduce the forceps into the bladder, keeping them ſhut till you touch the ſtone, when you muſt graſp it with a moderate force, and extract it by pulling downwards towards the *rectum*. Should you find a difficulty in laying hold of the ſtone, be careful to keep your forceps in ſuch a poſition, that they may open upwards and downwards, (not laterally), which will very much facilitate the embracing of the ſtone in caſe it ſhould happen to be thin and flat.

CHAP. XX.

Of the HIGH OPERATION.

THIS method of cutting for the ſtone was firſt publiſhed in the year 1561, by *Pierre Franco*, who, in his treatiſe of *Hernias*, ſays he once performed it on a child with very good

good ſucceſs, but diſcourages the farther practice of it. After him *Roſſetus* recommended it with great zeal, in his book intitled *Partus Cæſareus*, printed in 1591; but he never performed the operation himſelf. Monſieur *Tolet* makes mention of its having been tried in the *Hotel Dieu;* but without entering into the particular cauſes of its diſcontinuance, ſays only that it was found inconvenient. About the year 1719, it was firſt done in *England* by Mr *Douglas*, and after him practiſed by others. The manner of performing it, with the improvements made ſince *Franco*'s operation, is this.

The patient being laid on a ſquare table, with his legs hanging off, and faſtened to the ſides of it by a ligature paſſed above the knee, his head and body lifted up a little by pillows ſo as to relax the abdominal muſcles, and his hands held ſteady by ſome aſſiſtants; inject through a catheter into the bladder as much barley-water as he can bear, which, in a man, is often about eight ounces, and ſometimes twelve: for the more eaſily doing this, an ox's *ureter* may be tied to the extremity of the ſyringe and handle of the catheter, which being pliable will prevent any painful motion of the inſtrument in the bladder.

The bladder being filled, an aſſiſtant, in order to prevent the reflux of the water, muſt graſp the *penis* the moment the catheter is withdrawn

withdrawn, holding it on one ſide in ſuch a manner as not to ſtretch the ſkin of the *abdomen;* then with a round-edged knife make an inciſion four inches long, between the *recti* and pyramidal muſcles, through the *membrana adipoſa*, as deep as the bladder, bringing its extremity almoſt down to the *penis:* after this, taking a crooked knife, continue the inciſion into the bladder, carrying it a little under the *os pubis;* and immediately upon the water's flowing out, introduce the fore-finger of your left hand, which will direct the forceps to the ſtone.

The method was at firſt received with great applauſe in *London;* but, after ſome trial was rejected, for the following inconveniences:

It ſometimes happens that the bladder, notwithſtanding the injection, ſtill continues ſo deep under the *os pubis*, that the *peritonæum* being neceſſarily wounded firſt, the inteſtines puſh out immediately at the orifice, and the urine afterwards empties into the *abdomen;* in which caſe, hardly any recover. The injection itſelf is exceedingly painful; and however ſlowly the fluid be injected, it diſtends the bladder ſo much more ſuddenly than the urine from the kidneys does, and ſo much faſter than it can well bear, that it not only is ſeldom dilated enough to make the operation abſolutely ſecure, but is ſometimes even

burſt,

burſt, or at leaſt its tone deſtroyed, by the haſty dilatation. What adds to the danger here, is the poſſibility of meeting with a contracted indurated bladder; which is a circumſtance ſometimes attending on the ſtone, and indeed an exceedingly dangerous one in all the other methods, but would be frightful in this, by reaſon not only of the neceſſity of wounding the *peritonæum*, but of the difficulty of coming at the ſtone. If the ſtone be very ſmall, it is hard to lay hold of it with the forceps, and in a fat man the fingers are not long enough for that purpoſe. If there are many little ſtones, it will ſcarce happen that more than nine at a time can be extracted; and if the ſtone breaks, it not only is impracticable to take it all away in the operation, but alſo, from the ſupine poſture of the patient, it will generally remain in the bladder; whereas, in the other methods, for the moſt part, it works itſelf out with the urine. But even ſuppoſing that the operation itſelf is proſperous, the conſequences generally are very troubleſome: for the urine, iſſuing out at an orifice where there is no deſcent, ſpreads itſelf upon the *abdomen*, and makes very painful excoriations; though, what is ſtill worſe, it ſometimes inſinuates itſelf into the cells between the bladder and *abdominal* muſcles, and together with the inflammation excited by the operation brings on a ſuppuration there, which

is

is always difficult to manage, and frequently mortal.

CHAP. XXI.

Of the LATERAL OPERATION.

THIS method was invented by an eccleſiaſtic, who called himſelf *Frere Jaques*. He came to *Paris* in the year 1697, bringing with him an abundance of certificates of his dexterity in operating; and making his hiſtory known to the court, and magiſtrates of the city, he got an order to cut at the *Hotel Dieu* and the *Charité*, where he performed this operation on about fifty perſons. His ſucceſs did not anſwer the promiſes he had made; and from that time his reputation ſeems to have declined in the world, if we may give credit to *Dionis*, who has furniſhed us with theſe particulars.

He was treated by the ſurgeons of thoſe times as ignorant and barbarous: and tho', upon inquiry into the parts which ſuffer in this method, it was once the opinion of ſome of the moſt eminent amongſt them, that it might be made a moſt uſeful operation if a few imperfections in the execution of it were removed; yet, after having given this judgment, they ſuddenly dropt the purſuit, for no other reaſon, to all appearance, but that

that they would not be obliged to any one but a regular ſurgeon for a diſcovery of ſo great conſequence. The principal defect in this manner of cutting was the want of a groove in his ſtaff, which made it difficult to carry the knife exactly into the bladder: nor did he take any care of his patients after the operation; ſo that, for want of proper dreſſings, ſome of the wounds proved fiſtulous, and other ill conſequences enſued. But I am inclined to think he ſucceeded better, and knew more at laſt, than is generally imagined; for I remember to have ſeen, when I was in *France*, a ſmall pamphlet, publiſhed by him in the year 1702, in which his method of operating appeared ſo much improved, that it differed in nothing, or but very little, from the preſent practice. He had by this time learnt the neceſſity of dreſſing the wound after the operation; and had profited ſo much from the criticiſms of Meſſieurs *Mery*, *Fagon*, *Felix*, and *Hunauld*, that he then uſed a ſtaff with a groove; and, what is more extraordinary, had cut thirty-eight patients ſucceſſively at *Verſailles*, without loſing one, as appeared by a certificate annexed to the piece.

Amongſt many that ſaw *Frere Jaques* operate, was the famous profeſſor *Rau*, who carried his method into *Holland*, and practiſed it with amazing ſucceſs. He never publiſhed any

any account of it himſelf, though he admitted ſeveral to his operations: but ſince his death, his ſucceſſor *Albinus*, profeſſor of Anatomy and Surgery at *Leyden*, has given the world a very circumſtantial detail of the ſeveral proceſſes of it; and mentions as an improvement upon *Frere Jaques*'s manner, that he made his inciſion thro' the bladder beyond the proſtate: but whoever will try the experiment of making a wound in that place, without touching the proſtate, on a ſtaff ſuch as *Albinus* has delineated, which is of an ordinary length, will find it almoſt impracticable; for if, by inclining the ſtaff a little towards the *abdomen* and right groin, you endeavour to raiſe that part of the bladder towards the wound, it ſlips out all but the very end of it into the *urethra*, and leaves no direction for the knife. Beſides, that he cut the proſtate, may be gathered from the event of ſome caſes which Mr *Cheſelden* publiſhed, when he firſt undertook the lateral operation. He conſidered it as almoſt impoſſible to make the inciſion in this place, unleſs the bladder were diſtended: to which purpoſe he injected as much barley-water as the patient could ſuffer, which made it protuberate forwards, and lie in the way of the external wound; ſo that, leaving the ſtaff in, he cut very eaſily upon it. The operations were exceedingly dexterous: but the wound of the bladder retiring

tiring back when it was empty, did not leave a ready iſſue for the urine; which, inſinuating itſelf amongſt the neighbouring muſcles and cellular membranes, deſtroyed four of the ten which he practiſed this method upon, and ſome of the others narrowly eſcaped.

If, therefore, this was the conſequence of a wound of the bladder beyond the proſtate in ſo many inſtances, and we find by experience that it is exceedingly difficult in ſome men to carry the inciſion even ſo far as the proſtate, ſure it is poſſible that *Albinus* may be miſtaken in his deſcription, or even that *Rau* himſelf, if he was of that opinion, might be deceived in the parts he wounded; ſince we know it was generally thought, till within theſe few years, that the bladder itſelf was cut in the old way.

After this unſucceſsful trial, Mr *Cheſelden* made uſe of the following method, which is now the practice of moſt *Engliſh* operators.

The patient being laid on a table, with his hands and feet tied, and the ſtaff paſſed as in the old way, let your aſſiſtant hold it a little ſlanting on one ſide, ſo that the direction of it may run exactly thro' the middle of the left *erector penis* and *accelerator urinæ* muſcles; then make your inciſion through the ſkin and fat, very large, beginning on one ſide of the ſeam *in perinæo*, a little above the place wounded in the old way, and finiſhing a little below the

the *anus*, between it and the tuberoſity of the *iſchium:* this wound muſt be carried on deeper between the muſcles, till the proſtate can be felt; when ſearching for the ſtaff, and fixing it properly if it has ſlipt, you muſt turn the edge of the knife upwards, and cut the whole length of that gland from within outwards, at the ſame time puſhing down the *rectum* with a finger or two of the left-hand, by which precautions the gut will always eſcape wounding; after which the operation finiſhes nearly in the ſame manner as with the greater apparatus.

If, upon introducing the forceps, you do not perceive the ſtone readily, you muſt lift up their handle, and feel almoſt perpendicularly for it; ſince for the moſt part, when it is hard to come at, it lies in one of the *ſinuſes* ſometimes formed on each ſide of the neck of the bladder, which project forward in ſuch a manner, that, if the ſtone lie there, the forceps paſs beyond it the moment they are through the wound; ſo that it would be impoſſible to lay hold of it, or even to feel it, if not aware of this circumſtance.

When the ſtone breaks, it is much ſafer to take away the fragments with the forceps, than to leave them to be diſcharged with the urine: and if the pieces are very ſmall, like ſand, a ſcoop is the beſt inſtrument; though ſome prefer the injecting barley-water into the

the bladder, which ſuddenly returning brings away the broken particles of the ſtone.

As there are hardly any inſtances of more ſtones than one, when the ſtone taken away is rough; ſo, when it is ſmooth and poliſhed in any part of it, it is almoſt a certain ſign of others behind: on which account, an operator ſhould be careful, in that caſe, to examine not only with his fingers, but ſome convenient inſtrument, for the remaining ones: tho' indeed, in all caſes, it may be proper to examine the bladder after the extraction of a ſtone; becauſe it is poſſible there may be a ſecond ſtone, notwithſtanding the firſt be rough.

The great inconvenience of the lateral operation is the hæmorrhage which ſometimes enſues in men; for in children the danger of it is not worth mentioning: this, however, is the principal objection which has prevented it being univerſally practiſed. But in all likelihood it will be more general when the merits of the method are better known, and it is once diſcovered that the ill conſequence of moſt of theſe hæmorrhages is owing more to an error in operating, than to the nature of the operation; for I think I can poſitively ſay, that all thoſe branches of the hypogaſtric artery which lie on this ſide of the proſtate may be taken up with the needle, if the wound be made large enough to turn it about

freely at the bottom. Yet this is a circumſtance that many ſurgeons have been deficient in; and, inſtead of making it three or four inches long in a man, they have ſometimes made it not above an inch; in which caſe, it is not only impoſſible to tie the veſſels between the ſkin and bladder, but it alſo prevents the proper application of lint or ſtyptics to the artery creeping on the proſtate: ſo that it is not ſurpriſing the operation ſhould be diſcountenanced, when the practice of it is attended with this difficulty.

I have here mentioned lint or ſtyptics as a proper application to ſtop the hæmorrhage from the artery of the proſtate; but if they ſhould not prove effectual, I would adviſe the introduction of a ſilver canula through the wound into the bladder, which ſhould be three or four inches long, according to the depth of the wound, and almoſt as thick as a man's little finger. It muſt be covered with rag or lint (that it may lie ſoft), and continue in the bladder two or three days, before it is taken away.

If in the operation any very large veſſel of the external wound ſhould be divided, it is adviſable to tie it before the extraction of the ſtone; but the neceſſity of doing this, does not occur once in twenty times. It rarely happens that the veſſels of the proſtate burſt open any conſiderable time after the operation,

if

if they did not bleed during the performance of it: but as it is the nature of the ſymptomatic fever to dilate the veſſels and quicken the motion of the blood, it is proper to be upon our guard, eſpecially in plethoric people, and endeavour to obviate the accident by taking away ten or twelve ounces of blood from the arm, and giving an opiate immediately.

There is but one object more of any conſequence, which is, the danger of wounding the *rectum*; and this, I confeſs, is a very troubleſome accident: but if the operator obſerves the rule I have laid down with regard to that article, I ſhould hope it might always be avoided.

In this deſcription, I believe I have been ſo far from diſguiſing the inconveniences of the lateral operation, that before I ſpeak of its advantages I ſhould once again repeat, that theſe effuſions of blood are but very rare, and ſeldom or never mortal when properly managed; of which the world needs no better proof than the late extraordinary ſucceſs we have cut with in our hoſpitals, which I believe has never been equalled in any time or country.

In this method the remarkable parts wounded by the knife are, the *muſculus tranſverſalis penis*, *levator ani*, and *proſtate gland:* in the old way, the *urethra* only is wounded, about two inches on this ſide the proſtate, and the

inſtruments are forced thro' the reſt of the paſſage, which is compoſed of the bulbous part of the *urethra*, the membranous part of the *urethra*, the neck of the bladder, and *proſtate gland*. This channel is ſo very narrow, that, till it be torn to pieces, the management of the forceps is exceedingly difficult: and it happens frequently, that, from the tender texture of the membranous parts, the forceps are unwarily puſhed thro' it between the *os pubis* and bladder; beſides that, in introducing the gorget upon the ſtaff, it is apt to ſlip downwards between the *rectum* and bladder; both which inconveniences are avoided in the lateral operation. It is true, the wound made in the lateral method, will not admit of the extraction of a large ſtone without laceration, as well as in the old way: but in the one caſe, the laceration is ſmall, and made after a preparation for it by an inciſion; and in the other, all the parts I have mentioned are torn without any previous opening, and which are ſo very tight, that the pain of the diſtenſion muſt neceſſarily be exceſſive. It is pity, the operators do not in the old way always ſlide the knife along the groove of the ſtaff, till they have quite wounded through the length of the proſtate, ſince they are convinced, that, by the extraction of the ſtone, it is opened in a ruder and more dangerous manner than by inciſion, and without any

advantages

advantages from it; becauſe this opening is made by the finiſhing of the operation; whereas for want of it, before the extraction, we can hardly widen the forceps enough to receive a large ſtone; and when we do, the reſiſtance is ſo very great, as often to break it, notwithſtanding all our care. However, in both theſe operations, the ſurgeon muſt not graſp the ſtone with violence; and, even in extracting, muſt, with both hands to the branches of his forceps, reſiſt their ſhutting ſo tight, as the compreſſion from the lips of ſuch a narrow wound would otherwiſe make them. Here I ſpeak of the difficulty of laying hold of a ſtone in any part of the bladder; but if it happens to lie in one of the *ſinuſes* before mentioned, the forceps are ſo confined that it becomes ſtill harder. The extraction of very large ſtones, is much more impracticable with the greater apparatus than by this method, becauſe of the ſmallneſs of the angle of the bones in that part where the wound is made; ſo that indeed it is neceſſary in almoſt all extractions to pull the ſtone downward towards the *rectum*, which cannot be done without great violence to the membranous parts, and even the ſeparation of one from another; whence follow abſceſſes and ſloughs about the wound, which is a circumſtance not known in the lateral operation. *Ecchymoſes* followed by ſuppuration and gangrene

ſometimes ſpread themſelves upon the *ſcrotum*; and, in ſhort, all the inconveniences and ill ſymptoms which attend upon the lateral operation, except the hæmorrhage, are in a more violent degree incident to the old way.

An incontinence of urine is not common after the lateral operation, and a fiſtula ſeldom or never the conſequence of it. But the prevention of a fiſtula ſeems to depend very much upon the ſkill of dreſſing the wound afterwards: and perhaps it would not ſo often happen, if the dreſſing were rightly managed in the old way; though certainly this method is much more liable to them, as the wound is made among membranes, is more contuſed, and in many, from an incontinence of urine, is continually kept open. I have ſeen ſome inſtances, indeed, in the lateral operation, where, through neglect, the bladder has remained fiſtulous; but the wound being in a fleſhy part, I have, without great difficulty, got little granulations to ſhoot up, and healed it externally: ſo that, at preſent, I think a fiſtula can hardly be accounted one of the inconveniences of cutting for the ſtone in the lateral way.

The manner of treating the patient after the operation, is pretty nearly this: If it happens that the veſſels of the proſtate bleed, dry lint, or lint dipped in ſome ſtyptic water, ſuch as *aqua vitrioli*, muſt be applied to the part,

part, and held there with a conſiderable degree of preſſure for a few hours; or, as I have before mentioned, a ſilver canula of three or four inches long, covered with fine rag, may be introduced into the bladder, and left there two or three days, which ſeldom fails to ſtop the hæmorrhage. The patient may alſo take an opiate. If the wound does not bleed, a little dry lint, or a pledget of digeſtive, laid gently in it, is beſt. The place where the patient lies ſhould be moderately cool, as heat not only diſpoſes the veſſels to bleed afreſh, but generally makes him low and faint. If, ſoon after the operation, he complains of a ſickneſs at the ſtomach, or even a pain in that part of the *abdomen* near the bladder, it is not always a ſign of a dangerous inflammation, but frequently goes off in half an hour: to aſſiſt, however, in its removal, a fomentation put into a hog's bladder, and applied pretty warm to the part in pain, will be of great ſervice. If the pain increaſes, after two or three hours, the conſequence is much to be feared; and in this caſe, bleeding, and emollient clyſters by way of fomentation to the bowels, are immediately neceſſary.

The firſt good ſymptom, after the operation, is the urine coming freely away, as we then know the lips of the bladder and proſtate gland are not much inflamed; for they often grow turgid, and ſhut up the orifice in

ſuch a manner, as not only to prevent the iſſue of the water, but even the introduction of the finger or female catheter, ſo that ſometimes we are forced to paſs a catheter by the *penis*. From this ſymptom too we learn, that the kidneys are not ſo affected by the operation as to ceaſe doing their office; which, tho' a very rare circumſtance, may poſſibly occur. If the patient ſhould become languid, and continue without any appetite, bliſters prove beneficial; which may be applied with great ſafety and little pain, as there is ſeldom or never any ſtrangury. About the third or fourth day a ſtool muſt be procured by a clyſter, for it ſeldom comes naturally the firſt time; and this method muſt be continued as every man's diſcretion ſhall guide him. As ſoon as the patient comes to an appetite, he ſhould be indulged in eating light food, with this caution, that he do not eat too much at a time. It ſometimes happens, that, a fortnight or three weeks after the operation, one or both teſticles indurate and inflame; which diſorder may generally be removed by fomentations and diſcutient applications; or, if a ſuppuration enſue, which however is ſeldom the caſe, the abſceſs is not very difficult of cure.

If during the cure the buttocks ſhould be excoriated by the urine, let them be anointed with *nutritum*. The dreſſing from firſt to laſt,

is

is ſeldom any other than a ſoft digeſtive, or dry lint; for the whole art of healing the wound conſiſts in the force with which the doſſil is applied. If it be crammed in hard, it becomes a tent, and prevents the growth of the little tender ſhoots of fleſh, till in proceſs of time, from the continual diſtenſion, and long drain of the urine, the whole cavity becomes callous, and forms itſelf into a fiſtula: on the other hand, if the wound be dreſſed quite ſuperficially, the external parts of it being more prone to heal and contract than the internal, the conſequence will be a degree of obſtruction to the urine and matter, which lying about the wound of the bladder, for want of a diſcharge, will indurate that part, and likewiſe occaſion a fiſtula. This method of dreſſing is not peculiar to wounds after cutting for the ſtone, but is as applicable to *fiſtulæ in ano*, and almoſt all abſceſſes whatſoever: ſo that the branch of Surgery, which regards the treatment of hollow wounds, depends much more on the proper obſervance of this rule than the application of particular medicines.

CHAP. XXII.

Of the STONE *in the* URETHRA.

IF a ſmall ſtone be lodged in the *urethra* near the glans, it may often be puſhed out with

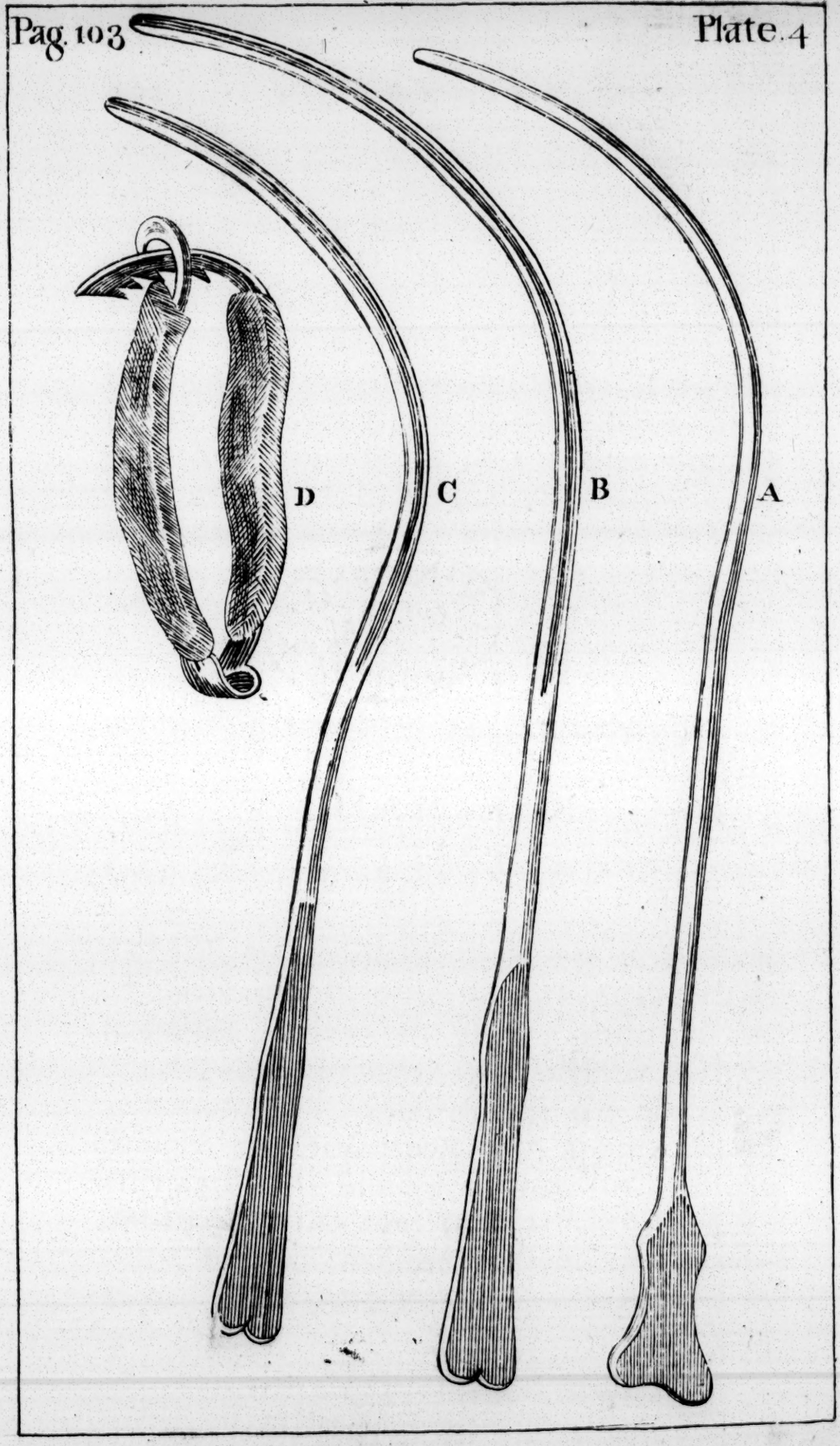
with the fingers, or picked away with ſome inſtrument; but if it ſtops in any other part of the channel, it may be cut upon without any inconvenience. The beſt way of doing it, is to pull the prepuce over the glans as far as you can; and then making an inciſion the length of the ſtone, through the teguments, it may be turned out with a little hook or the point of a probe: the wound of the ſkin ſlipping back afterward to its proper ſituation, and from the orifice of the *urethra*, prevents the iſſue of the urine through that orifice, and very often heals in twenty-four hours. This is a much leſs painful method of extracting ſtones from the *urethra*, than by any inſtruments that have been hitherto deviſed.

CHAP. XXIII.

Of the Extraction of the Stone in WOMEN.

THE extraction of the ſtone in women will eaſily be underſtood, ſince the whole operation conſiſts in placing them in the ſame manner as men, and, without making any wound, introducing into the bladder a ſtraight director, upon that a gorget, and afterwards the forceps to take hold of the ſtone; all which may be done without difficulty, by reaſon of the ſhortneſs of the *urethra*. If the ſtone proves very large, and in extracting




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extracting draws the bladder forwards, it is adviſable to make an inciſion through the neck of it upon the ſtone, which not only will facilitate the extraction, but alſo be leſs dangerous than a laceration, which would neceſſarily follow. The dreſſings are fomentations and emollient ointments, which ſhould be applied two or three times a-day, and the patient in other reſpects be treated like men who have undergone the operation for the ſtone.

PLATE IV.

The EXPLANATION.

A. A ſound uſed in ſearching for the ſtone.

The ſize repreſented here is but a little too large for the youngeſt children, and may be uſed upon boys till they are thirteen or fourteen years of age; a larger ſhould be employed between that age and adultneſs, when one of about ten inches, in a right line from the handle to the extremity, is proper. This ſhould be made of ſteel, and its extremity be round and ſmooth.

B. A ſtaff fit for the operation on boys from eight to fourteen years of age. The ſtaff for a man muſt be of the ſize of the ſound I have already deſcribed.

C. A ſtaff ſomething too big for the ſmall-

eſt

eſt children, but may be uſed upon boys from about four years of age to eight.

The ſtaff has a groove on its convex ſide, which firſt ſerves as a direction where to cut, and afterwards receiving the beak of the gorget, guides it readily into the bladder. Care ſhould be taken, in making the groove, that the edges of it be ſmoothed down, ſo that they cannot wound in paſſing through the *urethra*. The extremity ſhould alſo be open, otherwiſe it will be ſometimes difficult to withdraw the ſtaff when the gorget is introduced and preſſes againſt the end of it.

Theſe inſtruments are uſually made with a greater bending than I have here repreſented; but I think this ſhape more like that of the *urethra*, and rather more advantageous for making the inciſion.

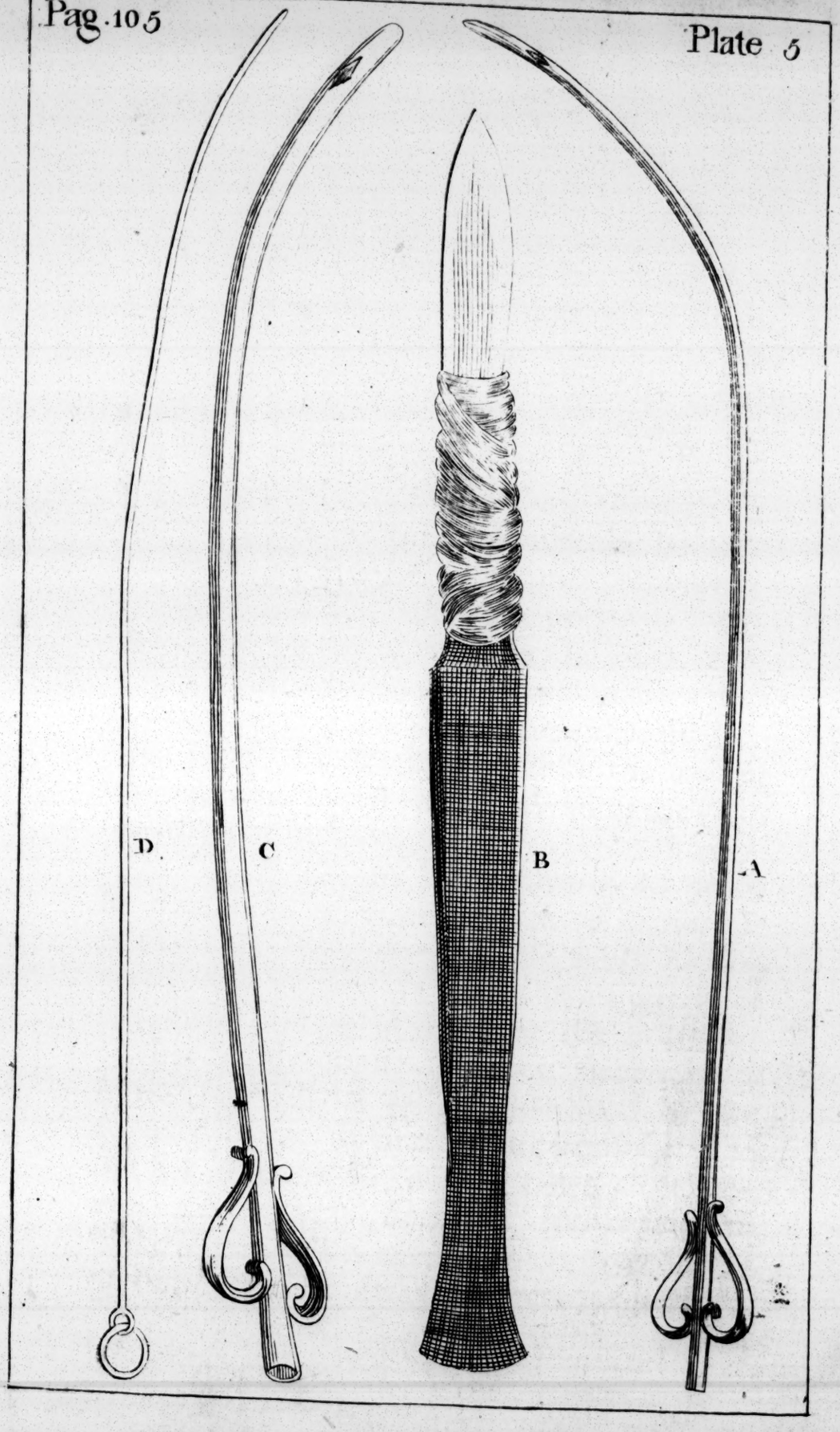
D. The yoke, an inſtrument to be worn by men with an incontinence of urine. It is made of iron, but for uſe muſt be covered with velvet. It moves upon a joint at one end, and is faſtened at the other by catches at different diſtances placed on a ſpring, as will be eaſily underſtood by the annexed print. It muſt be accommodated to the ſize off the *penis*, and be taken off whenever the patient finds in inclination to make water. This inſtrument is exceedingly uſeful, becauſe it always anſwers the purpoſe,

and

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Plate 5



and ſeldom galls the part after a few days wearing.

PLATE V.

The EXPLANATION.

A. A ſmall catheter made of ſilver. This inſtrument is hollow, and ſerves to draw off the urine when under a ſuppreſſion: It is alſo uſed in the high operation, to fill the bladder with water. Near its extremity are two orifices, through which the water paſſes into its cavity: care ſhould be taken that the edges of theſe orifices are quite ſmooth.

B. The knife uſed in cutting for the ſtone: it is the ſame I have already deſcribed; but I thought it might not be improper to repeat the figure with the alteration of a quantity of tow twiſted round it, which makes it eaſier to hold when we perform the lateral operation, and turn the edge upwards to wound the proſtate glan.

C. A female catheter, different from the male catheter, it being almoſt ſtraight and ſomething larger.

D. A ſilver-wire to paſs into either catheter, for the removing any grumous blood or matter that clogs them up.

PLATE

PLATE VI.

The EXPLANATION.

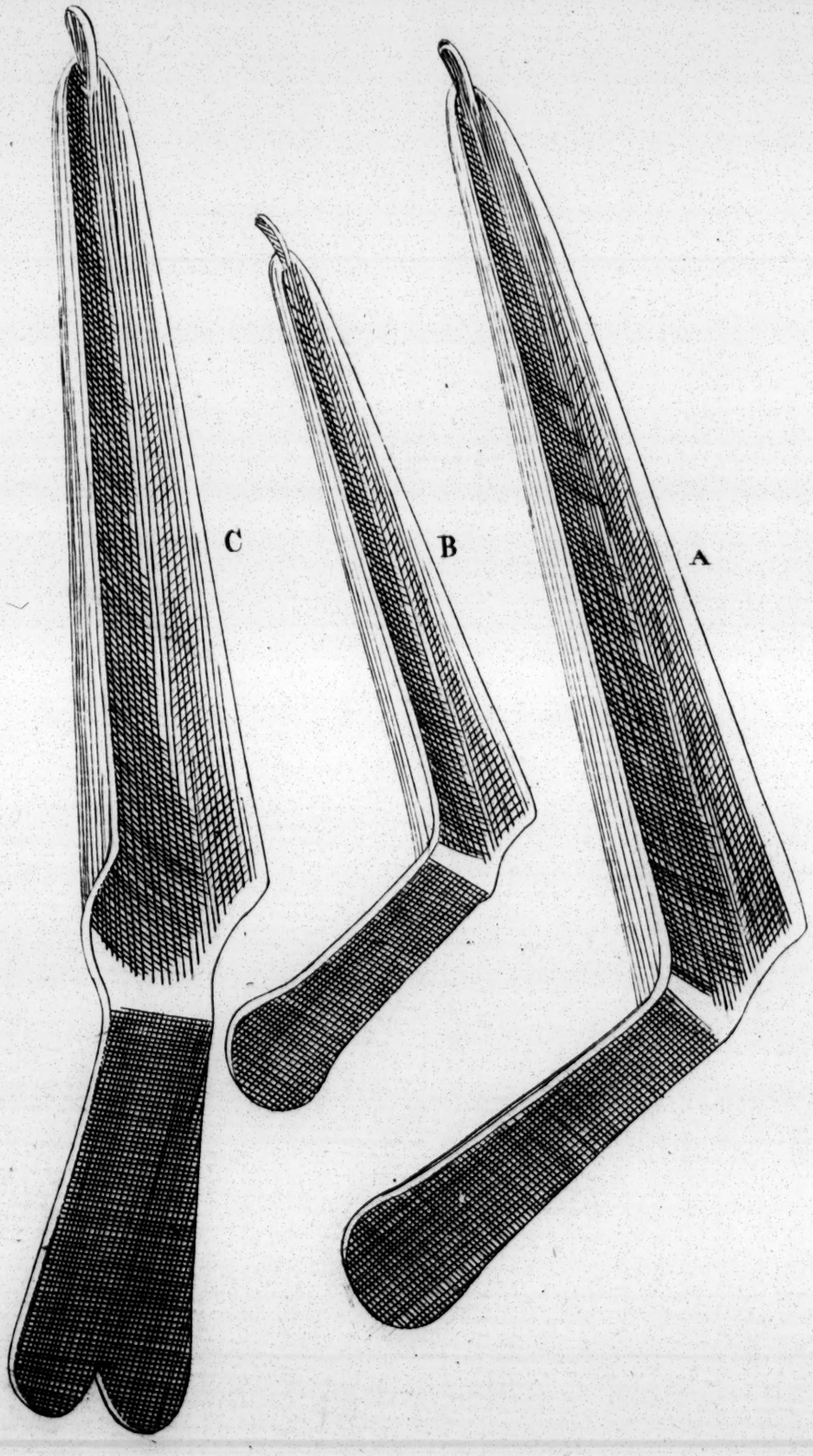
A. The gorget uſed upon men in the lateral operation.

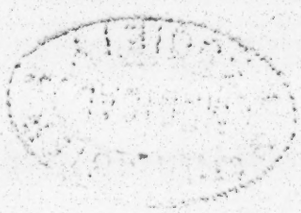
B. The gorget uſed upon children under five years of age, in the lateral operation.

A gorget between the ſizes of theſe two, will be fit for boys from five years of age to fifteen or ſixteen.

Theſe inſtruments are hollow for the paſſage of the forceps into the bladder; and their handles lie ſlanting, that they may the more readily be carried through the wound of the proſtate, which is made obliquely on the left ſide of it. The beak at the extremity of the gorget muſt be ſmaller than the groove of the ſtaff which is cut upon, becauſe it is to be received in the groove. Care ſhould be taken that the edges of the gorget near the beak are not ſharp, leſt, inſtead of dilating the wound as it ought, it ſhould only cut on each ſide when introduced; in which caſe, it would be difficult to carry the forceps into the bladder.

C. A gorget, with its handle exactly in the middle; this ſhaped inſtrument is uſed in the old way. All the gorgets ſhould be made of ſteel.


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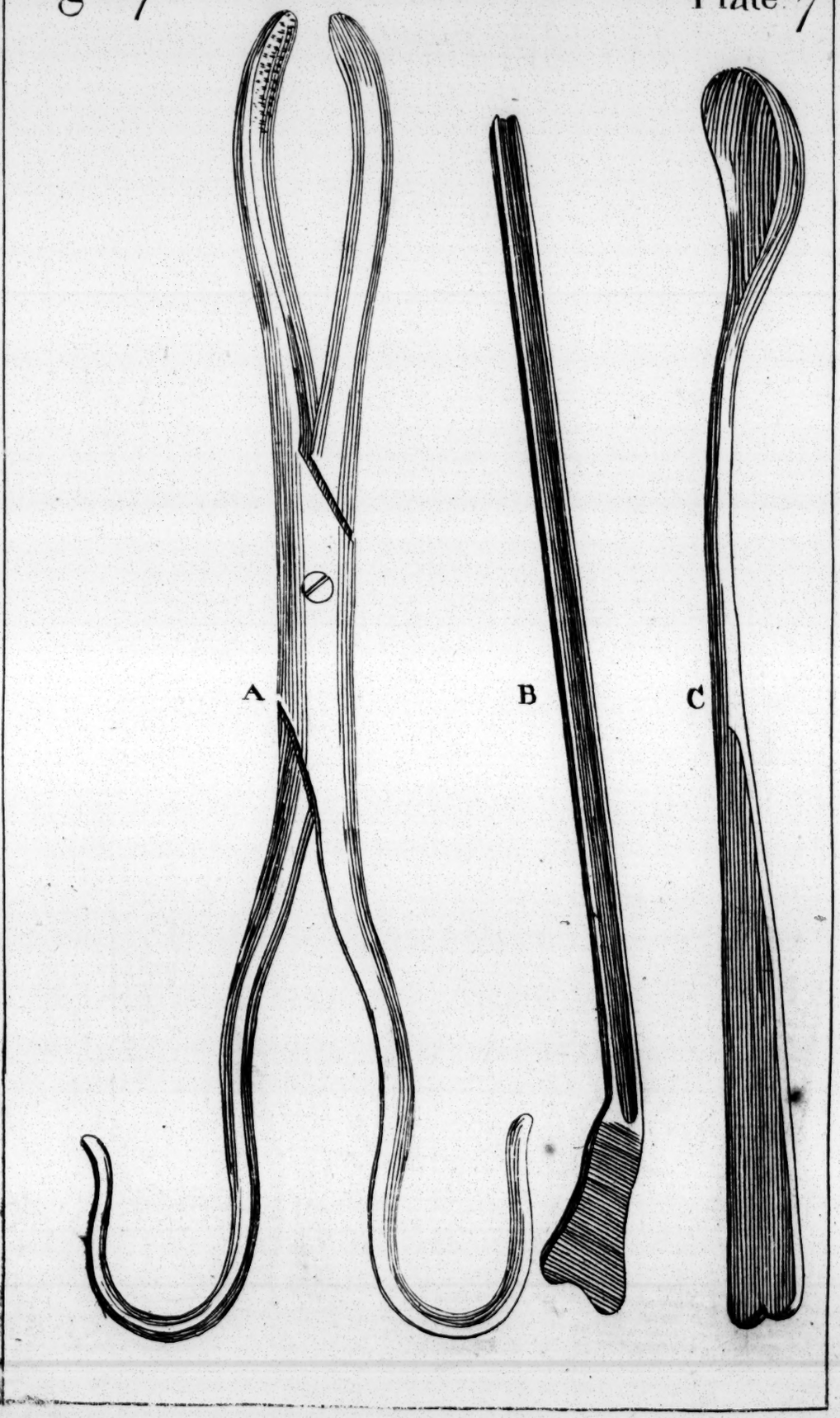

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PLATE VII.

The EXPLANATION.

A. The forceps for extracting the ſtone. Theſe are repreſented a little open, that the teeth may be better ſeen within-ſide.

This inſtrument muſt be of different ſizes for different ages and ſtones, from the length of that in the copper-plate, to one of near a foot long; but the forceps of about eight inches long will be found moſt generally uſeful. The number neceſſary to be furniſhed with, will be four or five.

Great care ſhould be taken by the makers of this inſtrument, that it move eaſily upon the rivet, that the extremity of the chops do not meet when they are ſhut; and particularly that the teeth be not too large, leſt in entering deep into the ſtone they ſhould break it: it is of conſequence alſo, that the teeth do not reach farther towards the joint than I have here repreſented, becauſe a ſmall ſtone, when received into that part, being held faſt there, would dilate the forceps exceſſively, and make the extraction difficult; on which account, the inſide of the blades near the joint ſhould be ſmooth, that the ſtone may ſlip towards the teeth.

B. A director made of ſteel, uſed for the direction

direction of the gorget in the extraction of the ſtone from women.

C. A ſcoop to take away the ſtone when it is broken into ſmall pieces like ſand. This inſtrument is made of ſteel.

CHAP. XXIV.

Of the EMPYEMA.

THE operation for the *empyema* generally implies an artificial opening made into the cavity of the *thorax*, by which we evacuate any fluid that lies there extravaſated, and is become dangerous by its weight and quantity. The fluids deſcribed as neceſſary to be voided by this operation, are blood, matter, and water.

When blood is the fluid ſuppoſed to require evacuation by this method, it is always extravaſated through ſome wound of the veſſels of the lungs or *thorax;* and being diſcharged in great quantities on the diaphragm, it is ſaid to oppreſs reſpiration till let out by ſome convenient opening, made in the moſt depending part of that cavity, which is the only kind of perforation into the *thorax* diſtinguiſhed by the name of the *operation for the empyema.* But though this opening is univerſally recommended in the caſe here ſtated, yet we meet with few or no examples where

where it has been practiſed for a mere extravaſation of blood; and I ſhould think it can hardly ever be adviſable on this account: for if we perform it immediately after the accident, and during the hæmorrhage, the opening made at the bottom of the *thorax* might probably make way for a dangerous effuſion of blood, which perhaps would otherwiſe be choaked up and ſtopped for want of a ready iſſue; and if we wait till the hæmorrhage ceaſes, it becomes needleſs, becauſe the blood not only for the moſt part finds ſome vent by the external wound if left open, but is conſtantly ſpit up the *trachea;* ſo that had we no farther proofs of this abſorbent power in the lungs, we might from hence be perſuaded of the probability of its being more ſafely carried off ſo, than by any artificial opening we can poſſibly contrive in the *thorax.*

Or if it be thought that the extravaſated blood, being coagulated in the *thorax*, cannot be taken up by the veſſels of the lungs; yet, even in that caſe, the operation uſually practiſed will not anſwer the purpoſe: for beſides the poſſibility of the lungs adhering to the *pleura* in the place of inciſion, which would abſolutely prevent any advantage from it, the depth and narrowneſs of the orifice, and its height above the diaphragm, on which the

congealed blood is ſuppoſed to lie, will make the ſucceſs at beſt but very precarious.

To empty the *thorax*, in a rupture of any veſſels which open into it, bleeding is very neceſſary: for it not only ſtops the hæmorrhage, by abating the force of the circulation; but likewiſe, by unloading the veſſels of their contents, makes them more fit to receive the extravaſated fluid by abſorption. Gentle evacuations and pectorals are alſo very ſerviceable, and a low diet is abſolutely neceſſary.

The rules laid down in ſome books for diſtinguiſhing if a wound penetrates, have led practitioners into miſchievous methods, by adviſing them to examine theſe wounds with the probe, or, for more certainty, the finger; which, if rudely uſed, ſometimes even tear into the *thorax*, always force or preſs the parts too much, and often ſeparate the lungs from the *pleura* when they happen to adhere: all which violences will produce abſceſſes there, eſpecially if the part be afterwards dreſſed with large tents, or filled with any active injection, both which were formerly applied with a view to deterge the cavity of the wound, but now ſeem to be exploded in favour of more ſuperficial dreſſings; the advantages of which method, in my opinion, cannot be too much inculcated.

But what I have here advanced concerning the excellence of ſuperficial applications, without

out dilating the wound to make way for the iſſue of the blood or ſucceeding matter, muſt be conſidered with regard to punctures or inciſions by ſharp inſtruments, not followed with a great diſcharge. For where the wound is made by fire-arms, the method of practice muſt be ſometimes altered; becauſe not only ſloughs and great ſuppurations enſue, but very often pieces of the ſhirt or coat are carried in with the bullet, which will perhaps require an enlargement of the wound in order to be freely diſcharged: though even upon this account there will be no occaſion to make an opening at the bottom of the *thorax*, ſince the more dilatation of the wound will more readily give vent to the *pus* and extraneous bodies, than an orifice made lower; becauſe the lungs, being inflamed by the wound, will generally adhere to the *pleura*, and break off the communication between the abſceſs and the cavity below it. In dreſſing the dilated wound, care muſt be taken to apply the doſſils with ſuch preſſure only as ſhall be ſufficient to keep open the external orifice; and not to crowd them into the *thorax*, ſo as to lock up that matter, which the very deſign of dilatation is to give a diſcharge to.

The ſecond circumſtance in which this operation takes place, is a rupture of matter from the *pleura*, *mediaſtinum*, or lungs, into the cavity of the *thorax*; where accumulating, it at

length proves fatal for want of a diſcharge. It is true, that the caſe occurs but very ſeldom where the operation is neceſſary; becauſe, in moſt abſceſſes of the *thorax*, the matter is uſually ſpit up as faſt as it is generated, and in the diſſection of ſuch who have died of this ſpecies of conſumption, we rarely find much extravaſated *pus* in the cavity, tho' a great portion of the lungs be deſtroyed. However, as I have intimated, there are a few examples which require the operation; and they may be diſtinguiſhed by the following ſymptoms. The patient is obliged to lie upon the diſeaſed ſide, or, in caſe there is matter in both cavities of the *thorax*, on his back; becauſe the *mediaſtinum* can ſeldom ſupport the weight of the incumbent fluid, without ſuffering great pain; but this rule is not certain, it ſometimes happening that the patient can lie with eaſe on that ſide where there is no fluid. Another ſymptom of extravaſated matter, is an evident undulation of it, ſo that in certain motions it may be heard to quaſh. For the moſt part too, upon careful inquiry, an *oedema*, or at leaſt a thickening of ſome portion of the intercoſtal muſcles, will be diſcovered. And laſtly, if there be much fluid, it will be attended with a preternateral expanſion of that ſide of the cheſt where it lies. When therefore theſe ſigns appear after a previous *pleuritic* or *pulmonary* diſorder, and the caſe has been

been attended with the ſymptoms of a ſuppuration, it is moſt probably owing to a collection of matter: though the patient will alſo labour under a continual low fever, and a particular anxiety from the load of *fluid*.

I have here deſcribed the abſceſs as breaking into the cavity of the *thorax*: but generally ſpeaking, in an inflammation of the *pleura* or lungs, an adheſion of both enſues; in conſequence of which, nature finds a diſcharge outwardly, it being moſt frequent for abſceſſes of the *pleura* and intercoſtal muſcles, and not uncommon even for abſceſſes of the lungs, to break externally. In caſe of an adheſion, no farther operation is required than opening the tumour, when ſuppurated, with a lancet; and if the diſcharge be ſo great as to forbid the healing the external ulcer, it may be kept open with a hollow tent; by which manner of treatment many have lived a long time with a running fiſtula.

The laſt ſort of fluid ſaid to require iſſue from this operation, is water; which, however, very ſeldom collects in ſuch manner as to become the proper ſubject of the operation. For if the dropſy of the *thorax* be complicated with an *anaſarca*, or even *aſcites*, it is certainly improper: and indeed it can hardly ever take place, but where the diſtemper is ſingle, and takes its riſe from the ſame ſort of diſorder in the lymphatics of the *pleura*, as the *hydro-*

cele does from thoſe of the *tunica vaginalis*. The ſymptoms of this dropſy are, a ſmall cough without ſpitting, a little ſlow fever from the diſturbance of reſpiration; ſometimes too the water, by a ſudden jerk, may be heard to quaſh; and, generally ſpeaking, its weight upon the *diaphragm* and *mediaſtinum* are ſo troubleſome as to oblige the patient to ſtoop forward when in an erect poſture, and to turn upon the affected ſide when he lies down, for the ſame reaſon that, when there is water in both cavities of the *thorax*, he is forced to lie on his back.

The manner of operating, whether it be for the diſcharge of matter or water, is to pitch upon the moſt depending part of the *thorax*, which ſome have ſuppoſed to be between the eighth and ninth ribs, and others between the ninth and tenth, at ſuch a diſtance from the *vertebræ*, that the depth of the fleſh may not be an impediment to the perforation. This diſtance is determined to be about a hand's breadth; and here, with a knife, ſciſſars, or trocar, we are ordered to make the perforation. But in doing it, there are a great many difficulties. In fat perſons, it is not eaſy to count the ribs; and the wound will be very deep, and troubleſome to make: it is hardly poſſible to eſcape wounding the intercoſtal artery, which runs in this place between the ribs; or, if you avoid it, by

cutting

cutting close to one of the ribs, a caries of the bone will follow from the pressure of the tent employed afterwards. Again, the inflammation of the wound may possibly affect the diaphragm, which is supposed almost contiguous to it; and this may prove of very ill consequence. So that, upon the whole, without any farther recital of objections to the *empyema* thus performed, it cannot appear an advisable operation. But if the only advantage proposed by this situation of the wound be derived from its dependency, the purpose of discharging the fluid will be as well answered by an opening between the sixth and seventh ribs half way from the *sternum* towards the spine; which, by laying ourselves down, becomes in effect as depending an orifice, as the other in sitting up; and by an opening made in this manner, we avoid all the inconveniences in the other method: for, in this part of the *thorax*, there is very little depth of muscles; the artery lies concealed under the rib; and the diaphragm is at a great distance: so that none of those mischiefs can ensue I have supposed in the other method; which consequently will give it the preference. The opening is best made with a knife; and should be about an inch long thro' the skin, and half an inch thro' the subjacent muscles: tho' to make the incision with less risk of wounding the lungs, it may be advisable

to dilate it with the blunt-pointed knife (as is practiſed in the operation for the *bubonocele*) after having made a ſmall puncture with a common knife. If it ſhould be objected, that the fluid cannot be diſcharged by this orifice while we are erect, whereas, by making it in the lower part of the *thorax*, it will be continually draining; I think it may be anſwered, that, after it is once emptied, it will hardly in twelve hours be generated in greater quantity than what will lie upon the diaphragm below the opening made even by that operation, and conſequently cannot be more readily diſcharged by one orifice than the other. The treatment of the wound will be according to the nature of the diſcharge. If, after a few days, there appears no drain, you may let the orifice heal up; but if it continues, it may be kept open with a ſhort ſilver *canula*, till ſuch time as an alteration in that circumſtance will give us leave to cicatrize with ſafety.

CHAP XXV.

Of Encyſted TUMOURS.

THESE tumours borrow their names from a cyſt, or bag, in which they are contained; and are farther diſtinguiſhed by the nature of their contents: if the matter forming them

them reſembles milk-curds, the tumour is called *athemora;* if it be like honey, *meliceris*; and if compoſed of fat, or a ſuety ſubſtance, *ſteatoma*. The two firſt are not readily diſtinguiſhed from one another, but their difference from the *ſteatoma* is eaſily learnt by their ſoftneſs and fluctuation. Theſe tumours appear in every part of the body, and in places where there are no glands; which, with the circumſtance of their compoſition continuing always the ſame from their firſt formation, agrees but little with an opinion ſome of the moderns are ſo fond of, that this kind of ſwelling is an obſtructed gland, whoſe membrane forms the cyſt, and whoſe fluids, when they burſt out of their veſſels after a long obſtruction, make the matter contained.

The *ſteatoma* is never painful till by its weight it grows troubleſome, nor is it a mark of general indiſpoſition of body; ſo that the extirpation ſeldom fails of ſucceſs. The ſize of ſome of them is very large, frequently weighing five or ſix pounds, and there have been inſtances of their weighing above forty.

When the *ſteatoma* is irregular in its ſurface, with eminencies and depreſſions, it is ſuety; whereas the fat one has for the moſt part an uniform ſmooth outſide. The operation for a *ſteatoma* will be underſtood by the deſcription of that for the ſcirrhus.

The *atheroma* is much more common than the

the *meliceris*, at leaſt, if all encyſted tumours with matter not curdled, may, in compliance with cuſtom, be called ſo:—theſe are more frequent, and grow larger, than thoſe where the matter is curdled, being often attendant on ſcrophulous indiſpoſitions, which makes them more difficult of cure.

The cyſts of theſe tumours, with the ſkin covering them, after a certain period of growth, reſiſting any farther enlargement, do frequently inflame and break; but this opening is not ſo advantageous for the cure, as extirpation by the knife, which ſhould be done in the infancy of the ſwelling. When the tumours are no bigger than a ſmall golden pippen, they may be diſſected away from under the ſkin, by making a ſtraight inciſion only through it: but if they exceed this bulk, an oval piece of ſkin muſt be cut thro' firſt, to make room for the management of the knife and taking away the tumour; in which caſe, it will be adviſable to take off the upper portion of the cyſt with the ſkin, and then by the help of a hook to diſſect away as much of the remainder of it as can be conveniently, which is a leſs painful and more ſecure method than deſtroying it afterwards with eſcharotics. This rule is to be obſerved, when the cyſt runs ſo deep amongſt the interſtices of the muſcles, as to make it impoſſible to remove the whole of it, where if

we

we cut off a great quantity, the reſt uſually comes away in ſloughs and matter. I once opened a remarkable *atheroma* of this kind; it was about as big as the crown of a man's hat, and lay underneath the pectoral muſcle (as all I ever met with on the breaſt have done), extending itſelf towards the arm-pit, amongſt the great veſſels, and preſſing againſt the clavicle. I cut away a large circular piece of the ſkin, pectoral muſcle, and cyſt; but did not dare to touch the lower part of it, which I could not remove without laying the ribs bare. However, it ſeparated in the digeſtion of the wound, which for ſome time diſcharged exceſſively, and the whole cavity filled up, leaving him the uſe of his arm almoſt perfect: after this, two or three ſmall ſplinters of the clavicle worked away through the ſkin, but without any great inconvenience.

The ganglion of the tendon is an encyſted tumour of the *meliceris* kind, but its fluid is generally like the white of an egg. When it is ſmall, it ſometimes diſperſes of itſelf; preſſure, and ſudden blows, do alſo remove it: but for the moſt part, it continues, unleſs it be extirpated. It is no uncommon caſe to meet with this ſpecies of ganglion, running under the *ligamentum carpale*, and extending itſelf both up the wriſt and down to the palm of the hand. The cure of this diſorder cannot be effected but by an inciſion through its whole

whole length, and dividing the *ligamentum carpale*, which I have performed ſucceſsfully ſeveral times.

The dreſſing in theſe caſes does not at all differ from the general methods of treating wounds.

CHAP. XXVI.

Of the AMPUTATION *of the Cancered and Scirrhous* BREAST.

THE ſucceſs of this operation is exceedingly precarious, from the great diſpoſition there is in the conſtitution, after an amputation, to form a new cancer in the wound or ſome other part of the body. When a ſcirrhus has admitted of a long delay before the operation, the patient ſeems to have a better proſpect of cure without danger of a relapſe, than when it has increaſed very faſt, and with acute pain. I cannot however be quite poſitive in this judgment; but, upon looking round amongſt thoſe I know who have recovered, find the obſervation ſo far well grounded. There are ſome ſurgeons ſo diſheartened by the ill ſucceſs of this operation, that they decry it in every caſe, and even recommend certain death to their patients rather than a trial, upon the ſuppoſition it never relieves: but the inſtances where

where life and health have been preſerved by it, are ſufficiently numerous to warrant the recommendation of it.

The ſcirrhus may be diſtinguiſhed by its want of inflammation in the ſkin; its ſmoothneſs and ſlipperineſs deep in the breaſt; and generally by its pricking pain, which, as it is more or leſs, increaſes the danger accordingly; though there are ſome few with little or none in the beginning. As the tumour degenerates into a cancer, which is the worſt degree of ſcirrhus, it becomes unequal and livid; and, the veſſels growing varicous, at laſt ulcerates.

In extirpating the ſcirrhus, if it be ſmall, a longitudinal inciſion will dilate ſufficiently for the operation: but, if too large to be diſſected out in that manner, an oval piece of ſkin muſt be cut through firſt, the ſize of which is to be proportioned to that of the tumour; for example, if the ſwelling is five inches long and three broad, the oval piece of ſkin cut away muſt be nearly of the ſame length, and about an inch and a half in breadth. In taking off the whole breaſt, the ſkin may be very much preſerved, by making the wound of it a great deal leſs than the baſis of the breaſt, which muſt be carefully cleared away from the pectoral muſcle. This is not difficult to do, becauſe all theſe ſcirrhuſes, being enlarged glands, are encompaſſed

paſſed with their proper membranes, which make them quite diſtinct from the neighbouring parts, and eaſily ſeparable. At leaſt this is the caſe when the tumour is moveable: for ſometimes it adheres to the ſubjacent muſcle, and that muſcle to the ribs; in which circumſtance the operation is impracticable. When it is attended with knots in the arm-pit, no ſervice can be done by amputation, unleſs the knots be taken away; for there is no ſort of dependence to be laid on their ſubſiding by the diſcharge of the wound of the breaſt.—The poſſibility of extirpating theſe knots without wounding the great veſſels, is very much queſtioned by ſurgeons; but I have often done it, when they have been looſe and diſtinct.

The bleeding of the great arteries is to be ſtopped by paſſing the needle twice through the fleſh, almoſt round every veſſel, and tying upon it, which will neceſſarily include it in the ligature. In order to diſcover the orifice of the veſſels, the wound muſt be cleaned with a ſpunge wrung out of warm water.

The ſcirrhous tumours which appear about the lower jaw, are, generally ſpeaking, ſcrophulous diſorders, that diſtinguiſh themſelves almoſt by the circumſtance of fixing on the ſalivary glands. Theſe are very ſtubborn of cure; but not ſo bad as the ſcirrhus, ſince they frequently ſuppurate, and heal afterwards. If they impoſthumate again after heal-

healing, it is for want of a good bottom, which may ſometimes be procured by deſtroying their bad ſurface with a cauſtic. Beſides theſe, there is another ſpecies of ſcirrhus in the neck, that ſucceeds better after extirpation than either of the former kinds. This is an enlargement of the lymphatic glands, which run cloſe up by the jugular vein; and is diſtinguiſhable from cancers of this part, by its moveableneſs, want of pain, the laxneſs of the ſkin covering it, the ſmall degree of preſſure it makes on the *æſophagus* and *trachea*; and laſtly, the good habit of body, as it ſeldom affects the conſtitution, which cancers here do very early after their firſt appearance. This tumour, from its ſituation, requires great exactneſs in the cutting off: the laſt I took away of this kind, I ſeparated from the jugular vein near the length of an inch and a half. They ſometimes extend up to the chin towards the mouth, and occaſion a diviſion of the ſalivary duct in operating, which proves very troubleſome to heal; but, when all other methods have failed, may be cured by a perforation into the mouth, through that part of the cheek where it is wounded, which by a tent or ſmall ſeton may be made fiſtulous; then by properly dreſſing upon the outſide, the oozing of the *ſaliva* that way will be prevented, and the external orifice healed without difficulty.

The

The treatment of all theſe wounds may be with dry lint firſt, and afterwards as in the common inciſed wounds.

CHAP. XXVII.

Of the Operation *of the* TREPAN.

THE operation of the *trepan* is the making one or more orifices thro' the ſkull, to admit an inſtrument for raiſing any pieces of bone that by violence are beaten inwards upon the brain, or to give iſſue to blood or matter, lodged in any part within the *cranium*.

Fractures of the ſkull are at all times very dangerous, not in conſequence of the injury done to the *cranium* itſelf, but as the brain becomes affected either from the preſſure of the fractured bone, or that of the extravaſated blood and matter. If then the ſymptoms excited by a fracture do ſometimes follow from a mere extravaſation of blood, as is the caſe when the *cranium* is not beaten inwards, it muſt likewiſe happen that a rupture of the veſſels of this part without a fracture will alſo occaſion the ſame diſorders: for this reaſon, the operation may take place where the ſkull is not much offended, but only the veſſels of the *dura mater*, the *pia mater*, or the brain.

The writers on this operation have deſcribed

bed the different diſorders in which it is uſeful, under a great variety of names; but thoſe few general ones, which all ſurgeons are acquainted with, are quite ſufficient for underſtanding the nature of every caſe that can happen.

When the *cranium* is beaten inward, without any fracture, it is called a *depreſſion*; when very much broken, a *fracture*; or if broken and beaten in alſo, a *fracture with depreſſion*; if it is only cracked, without depreſſion, though properly a fracture, it is called a *fiſſure*; if none of theſe diſorders appear, where there is a ſuſpicion of them, the ſymptoms are imputed to a concuſſion of the brain. Theſe are the four diſtinctions in uſe, and which fully comprehend all the others.

The depreſſion of the *cranium* without a fracture can but ſeldom occur; and then it happens to children, whoſe bones are more pliable and ſoft than thoſe of adults. I have met with one inſtance of this myſelf in a girl of ſeven years of age. When ſhe firſt received the injury, ſhe had the complaints of an oppreſſed brain, but they ſoon went off. The blow formed a large tumour on the parietal bone, for which ſhe was put under my care ſome days after the accident. I opened immediately into it, by cutting away a circular piece of the ſcalp, and took out a great quantity of grumous blood lying underneath the

perioſteum: I then dreſſed the depreſſion with dry lint; and finding no complaints come on, continued the ſame method, till in about ſix weeks ſhe was perfectly cured.

In blows of the *cranium* requiring the uſe of the trepan, the marks of a fracture are generally very evident, ſince the ſcalp is often lacerated ſo much as to expoſe it to our ſight: but if the wound of the ſcalp be ſo ſmall as only to admit a probe, we muſt judge then by the feel of the ſurface of the bone; uſing the caution of not miſtaking a ſuture for a fracture, which *Hippocrates* confeſſes he himſelf did; though for his frank confeſſion of an error, to prevent others being miſled, he is as much recommended to poſterity as for any of his other qualities.

If there be no wound of the ſcalp, you muſt preſs about the head with your fingers, till the patient complains of ſome particular part, which in all likelihood is the place affected, and, if the ſcalp there be ſeparated from the *cranium*, is almoſt infallibly ſo. The ſymptoms of a fracture are, a bleeding at the ears and noſe, a loſs of ſenſe, vomiting, drowſineſs, delirium, incontinence of urine and excrement: but what is moſt to be depended upon is, a depreſſion of the bone, or a roughneſs on its outſide; for all the other complaints not only happen to concuſſions which do well without the application of a trepan, but likewiſe

likewiſe there are fractures not attended with any of them, or at leaſt in a ſlight degree; ſo that theſe ſymptoms alone, without examination of the part affected, are but an uncertain rule to go by.

In concuſſions without a fracture, that produce the ſymptoms here laid down, and do well afterwards, the veſſels of the brain and membranes are only inflamed and dilated: or if they are ruptured, they abſorb the extravaſated blood again; on which account, nature ſhould be aſſiſted by plentiful bleedings, clyſters, and other evacuations, and ſo in all fractures where the patient is not trepanned immediately. However, although people with concuſſions in the violent degree I have ſtated, do ſometimes recover, it is ſo very ſeldom, that there can be no pretence, when they happen, for neglecting the trepan, but not being able to learn in what part the concuſſion is. The opportunities I have had of opening ſome people who have died under this circumſtance, have ſufficiently convinced me how little is to be truſted to any other method than an opening for the diſcharge of the abſceſs, which by confinement of matter becomes very large, ſpreading over a great quantity of the brain before it kills.

Writers diſpute very much about the poſſibility of the *contra-fiſſure*, or a fiſſure occaſioned on the part of the head oppoſite to that

on which the blow is given, or where the inner table is fractured, while the outer one remains entire: but there are hiſtories of caſes, which, if fairly ſtated, make it unqueſtionable; and this is moſt certain, that, if the the complaint be at a diſtance from where the blow was received, there can be no danger in ſcalping, and applying the trepan to that part where the pain is.

There are ſurgeons who ſay that the veſſels of the *diploë* do ſometimes by a concuſſion break; and that the matter making its way through the inner table of the ſkull into the brain, requires a trepan: but I believe there is no very good authority for this aſſertion.

When we are aſſured of a fracture or depreſſion, though the ſymptoms in a great meaſure go off, and notwithſtanding there are a few hiſtories in authors where we read that patients have ſurvived without the operation, it is, in my opinion, always adviſeable to trepan as ſoon as poſſible, in order to prevent the ſpreading of the abſceſs, which ſeldom fails to follow upon the rupture of the veſſels of the brain and membranes, and for the moſt part in a few days; though there are a great many inſtances of fractures not bringing on a fatal abſceſs for a great length of time after the accident.

I once trepanned a young woman about a hundred days after ſhe received the blow. The lower

lower part of the parietal and upper part of the temporal bones were fractured and depreſſed: ſhe bled at the noſe and ears when ſhe firſt received the injury; and had at times been drowſy, and in ſome little pain, till towards the ninetieth day, when the ſymptoms of a compreſſed brain came on ſtronger; and a ſmall time after, ſhe put herſelf under my care: which, with the many inſtances of the ſame kind to be met with in authors, ſhow how little ſafe it is to truſt to any extravaſation or depreſſion on the brain doing well without the aſſiſtance of the trepan.

The manner of treating a fracture of the *cranium*, will be according to the nature of the fracture itſelf, and the injury of the ſcalp. If the wound of the head be torn into angles, perhaps cutting off the lacerated flaps will make room for the ſaw; if the bone be broken into ſeveral pieces, the pieces may be taken away with the forceps; or if ſome of the ſkull be alſo depreſſed, the removal of the pieces will, without perforating, make way for the elevator to raiſe the depreſſed part: but if the fracture be not complicated with a wound of the ſcalp, or the wound be too ſmall to admit of the operation, which ſeldom fails to be the caſe, then the fracture muſt be laid bare, by taking away a large piece of the ſcalp. It is a faſhion with ſome ſurgeons, to make a

crucial inciſion for this purpoſe, which they prefer to the other method, upon the ſuppoſition that the wound will more eaſily heal again after the operation, by turning down the flaps; and in caſe we find no fracture, which ſometimes happens after ſcalping, that by making this ſpecies of wound an exfoliation of the bone and tedioufneſs of cure will be avoided. But whoever has ſeen the practice of the crucial inciſion, muſt be ſenſible of the falſe reaſoning uſed in its favour: for it ſeldom happens that we inquire for a fracture of the ſcull by ſcalping, but that the ſcalp itſelf is contuſed; which circumſtance generally bringing on a plentiful ſuppuration, and the matter lodging between the *cranium* and ſkin, not only prevent their immediate healing, but occaſion a caries of the bone, which is the accident meant to be ſhunned by it; and, frequently, at laſt the lips of the wound, growing callous, require cutting off, to procure a cicatrix. If then the objection be good to the crucial inciſion when no operation is performed, it becomes of ſo much more force when we are aſſured of uſing the trepan, that I think it is indiſputably right at all times, to take off the ſcalp when we lay bare the *cranium* with a view to the operation, which ſeldom fails to granulate with fleſh in a few days if dreſſed only with dry lint, and rarely grows carious, if not affected by a great

great diſcharge of matter from the brain, and even in that caſe but ſuperficially; or if, after it is thus expoſed, new fleſh ſhould not generate upon its ſurface, the growth of it may be quickened by boring little orifices into the ſubſtance of the bone, or raſping it with the rugine. The form of the piece taken away may be nearly circular; and to be better aſſured of the courſe of the fracture, it will be proper it ſhould be of the whole length of it. I believe there are few will care to expoſe ſo much naked ſkull; but whoever knows the great advantage and the little danger of it, will not heſitate. When the ſcalp is removed, the *perioſteum* muſt be raiſed, and the arteries immediately tied, which will make way for the operation to be directly performed; though the effuſion of blood has been eſteemed ſo troubleſome in this part, as to have made it almoſt an univerſal practice to poſtpone the uſe of the trepan to the day after: but the apprehenſion is without foundation; for if two or three of the larger veſſels are tied, the others may be eaſily ſtopped with a little dry lint, and the operation take place without any inconvenience, which I have always done myſelf, and would recommend to others, conſidering how urgent the nature of the diſtemper is, and that leſs than twenty-four hours is often the difference between life and death when the brain is much preſſed by a fractured bone.

Before the application of the trepan, it is to be remembered there are certain places on the ſkull where it cannot be uſed with ſo much ſafety as on others. The whole length of the ſagittal ſuture, down to the noſe, is always mentioned as one where the perforation is dangerous, becauſe of the ſpine of the *os frontis*, and the courſe of the ſuperior longitudinal *ſinus* under this part, which it is ſuppoſed would be neceſſarily wounded by the ſaw, and in conſequence deſtroy the patient by the hæmorrhage. But though a perforation may, contrary to the general opinion, be made over the *ſinus* without offending it, and, even if it was wounded, the effuſion of blood would not in all probability be mortal (as I have ſeen in two inſtances), yet at beſt it would be very troubleſome; and ſince we are not ſtraitened in that part of the *cranium* for room, I think it is adviſable to forbear operating in this place. The bony *ſinuſes* of the *os frontis* forbid the uſe of the trepan near the orbits of the eyes: therefore, if it ſhould be depreſſed near thoſe cavities, the ſurgeon muſt be careful to perforate either above or on one ſide of the fracture; for ſawing below it, will only lead into the *ſinus*, and anſwer no purpoſe in the deſign either of giving a diſcharge to the matter from the brain, or an opportunity to elevate the depreſſion; nay, perhaps

perhaps leave an incurable fiſtula, if the patient eſcapes with life.

The *os occipitis* being very uneven, both in its internal and external ſurface, makes trepanning there almoſt impracticable; beſides, the great *ſinuſes* run about ſo much of it, as hardly to afford ſpace to perforate without danger of wounding them. But then it is ſo defended from injuries by its ſituation and ſtrength, that fractures do not happen to it ſo often as to the other bones of the *cranium;* and when they do, for the moſt part they become ſo ſoon mortal, by affecting the *cerebellum*, which it ſuſtains, that the operation is ſeldom required in this caſe. Indeed the upper angle of this bone lies above the *cerebellum;* and, when fractured or depreſſed, is not attended with ſo immediate danger: but when this happens, the courſe of the longitudinal *ſinus* down the middle of it, and the neighbourhood of the lateral *ſinuſes* beneath it, make it adviſable to trepan at the lower part of the *os parietale*, or at leaſt upon or juſt below the lambdoidal future, ſo that the perforation of the *os occipitis* can hardly ever be proper.

It may be obſerved I have ſpoken of wounds of the *cerebellum* as proving inevitably mortal when affected by a fracture. How long a patient may continue with matter on its ſurface, I cannot take upon me to ſay: but I believe

believe there is no inſtance of a cure after an abſceſs; and as for wounds of it, they are generally almoſt inſtantaneous death; whereas ſometimes great portions of the *cerebrum* have been carried off, or deſtroyed, without any notable inconvenience. From this great difference of danger in affections of the *cerebrum* and *cerebellum*, has ariſen the opinion, that the firſt is the organ of animal motion only, and the other of vital.

The places, then, unfit to admit the ſaw, are the three I have deſcribed; that is, the ſagittal ſuture, that part of the *os frontis* near the orbits of the eyes, and the *os occipitis*. But when a fracture happens in any other part above the ear, there is no objection to the operation. When there is only a ſmall fiſſure without any depreſſion or motion in the bone, the trepan may be applied on the fiſſure itſelf, which will more readily give vent to the blood or matter underneath than if made at a diſtance. If the fiſſure be large, and the bone weakened or depreſſed, the trepan muſt be applied on one ſide of it, but ſo as to make it a part of the circumference of the ſawed piece: if the fracture run upwards, it will be eligible always to perforate near its bottom, becauſe the dependency of the orifice will give better iſſue to the matter; though the ill-grounded apprehenſion of the brain falling out there, has made many eminent ſurgeons

geons contradict this rule in their practice. If, by making one orifice, you cannot raiſe all the depreſſed part, you muſt make a ſecond and a third, and continue doing ſo till you have reduced the whole *cranium* even. There is frequently occaſion to repeat it twice or thrice; and it has been done twelve times, nay oftener, with ſucceſs; which I mention, to ſhow the little danger there is, either in ſawing the ſcull, or expoſing the *dura mater* and brain, when the preſſure is taken off. Indeed the miſchief of laying the brain bare is ſo ſmall, compared with a concuſſion of it, or an abſceſs from pent-up matter, that thoſe fractures of the ſcull, where the bone is broken into ſplinters the whole extent of it, and can be taken away, much more readily do well, than a ſimple fiſſure only, where the abſceſs cannot diſcharge itſelf freely: for which reaſon, though the depreſſed fracture may be raiſed by the means of one orifice, yet if it is of a conſiderable length, it will be almoſt abſolutely neceſſary to make one or two more openings, for the convenience of diſcharge; ſince, for want of this, we ſee abſceſſes increaſe daily in their quantity of matter, and at the end of a few weeks carry off the patient. Thoſe who are converſant in the diſſection of perſons dying of this diſorder, will be convinced of the force of this reaſoning, ſince they not only conſtantly find

pus

pus lodged in the brain as far as the fiſſure extends, but all round about it, ſometimes ſpreading over a quarter of its ſurface.

In concuſſions of the brain without a fracture of the *cranium*, if the trepan be applied, and vaſt diſcharges enſue, it will be alſo convenient to make more perforations into the abſceſs and the neighbourhood of the abſceſs, the ſituation of which will be eaſily gueſſed by the direction of the ſtream of matter. And here it is to be obſerved, that abſceſſes which enſue from a concuſſion are generally more extenſive and dangerous than thoſe which accompany a fracture with depreſſion: for in a fracture, the yielding of the bone deſtroys, in a great degree, the force of the ſtriking body, and prevents any violent commotion of the brain; ſo that what the brain ſuffers, reſults chiefly from the preſſure of the incumbent bone, and the laceration of the veſſels near the fracture; whereas, when the *cranium* reſiſts the ſhock, all or great part of the *cerebrum* ſuſtains the concuſſion, and is often impoſthumated or inflamed almoſt in its whole dimenſion, as we find upon opening thoſe who die of this diſorder.

The manner of trepanning is this: Having fixed your patient's head ſteady, either on the bolſter of a bed, or by placing him in a low chair, with the pin of your ſaw mark the centre of the piece of bone to be taken out;

out: then, with the perforating trepan, make an orifice deep enough to receive the pin; which being fixed in it, will prevent the ſaw from ſliping: and thus you are to continue ſawing, till the impreſſion made will preſerve the ſteadineſs without the pin; when it is to be taken away, for fear of its wounding the brain before the ſaw has entered through the *cranium*, which it would do at laſt, becauſe of its projection. In working through the bone, the teeth of the ſaw will begin to clog by that time you arrive to the *diploë:* wherefore a bruſh muſt be ready to clean it every now now and then, and with a pointed probe you muſt clear away the duſt in the circle of the trepanned bone; obſerving, if it be deeper on one ſide than the other, to lean afterwards on that ſide where the impreſſion is leaſt, that the whole thickneſs may be ſawed thro' at the ſame time. To do all this with leſs interruption, it will be proper to have two ſaws of exactly the ſame diameter, that an aſſiſtant may be bruſhing one while you operate with the other. We are adviſed to ſaw boldly, till we come to the *diploë;* which, it is ſaid, will always diſtinguiſh itſelf by the bloodineſs. But however, this is not a certain mark to go by: for tho' where there is a *diploë*, it will manifeſt itſelf by its bloodineſs, yet ſometimes the ſcull is ſo very thin as not to admit of any; in which caſe, if an operator

tor ſhould puſh on his inſtrument in expectation of meeting with this ſubſtance, he would unwarily wound the brain. This is not very often the caſe; but, however, often enough to put a man on his guard, and make him inquire whether the bone be looſe after a little ſawing, which is the only rule we go by when we have paſſed thro' the *diploë*, and may as well be attended to before coming at it, without any conſiderable loſs of time. When it is quite ſawed through and lies looſe, it may be taken away with the forceps contrived for that uſe; and if the lower edges of the orifice next to the *dura mater* are ſplintered, they may be ſcraped ſmooth with a lenticular.

Theſe are the chief proceſſes of the operation of the trepan; the only thing remaining to be done, is with an elevator, introduced at the orifice, to raiſe the depreſſion, or broken ſplinters if they cannot otherwiſe be laid hold of, and to draw out the grumous blood, or any other extraneous body. If the *dura mater* be not wounded or torn, an inciſion muſt be made through it, to give way to the blood or matter, which almoſt certainly lie underneath it, if the ſymptoms have been bad, and none has been diſcharged from between the *cranium* and *dura mater:* though it has been lately obſerved, that an abſceſs will ſometimes be formed in the ſubſtance of the brain;

brain; and therefore, if the puncture of the *dura mater* does not procure an evacuation of the matter, and the ſymptoms of a ſuppuration are ſtill urgent, it will be adviſable to make a ſmall inciſion with a lancet into the brain itſelf.

I have uſed the word *trepan* all along, for the ſake of being better underſtood; but the inſtrument I recommend is a *trephine*, the advantages of which, as alſo that of a cylindrical ſaw, or one nearly cylindrical, are deſcribed in the explanation of the copper-plate.

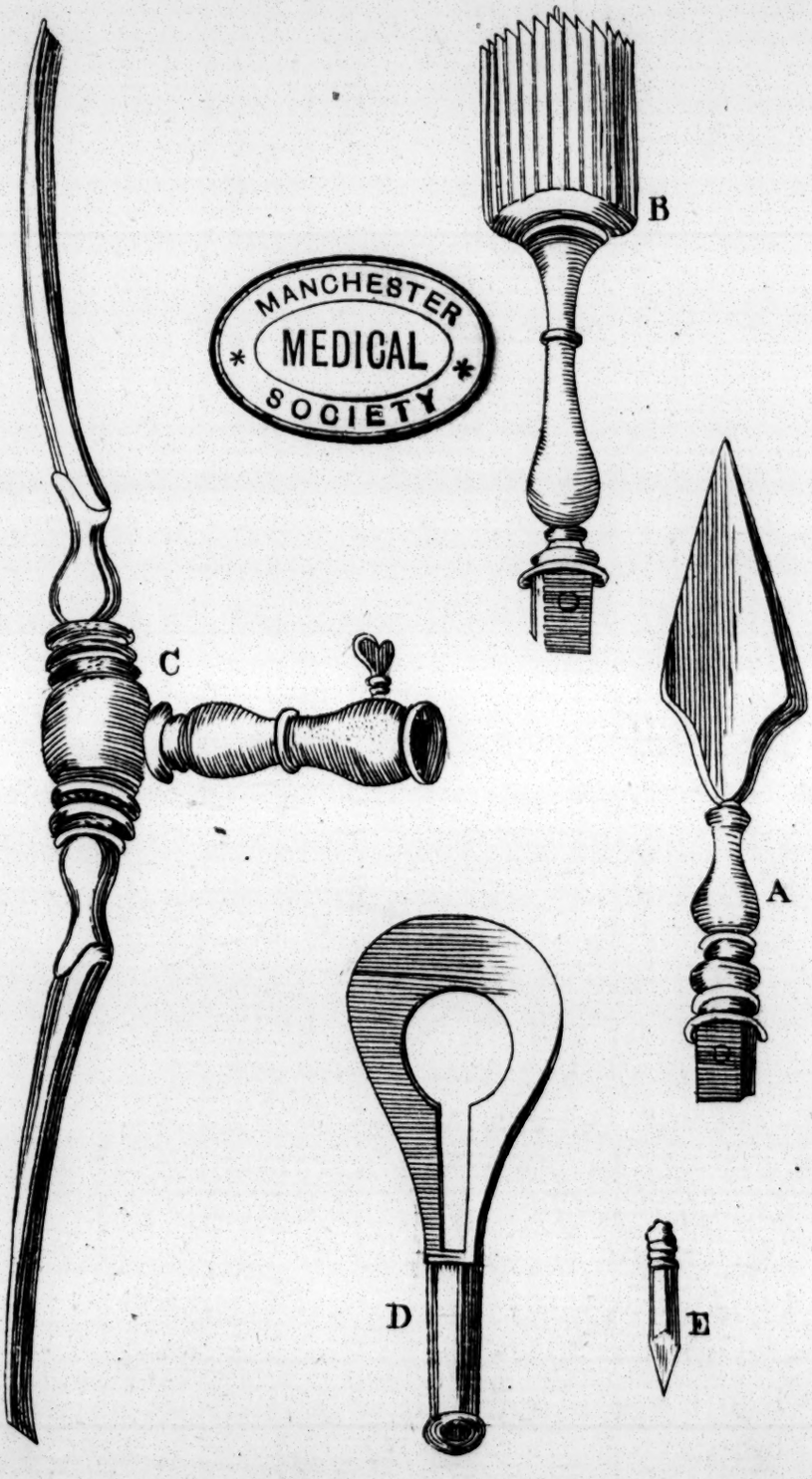
With regard to the dreſſings of theſe wounds, I think it is very certain, that as the greateſt part of the evil proceeds from the quantity and preſſure of the matter, whatever approaches towards the nature of a tent, and increaſes its quantity and preſſure by locking it up, muſt be pernicious: therefore, I would exclude the uſe of all ſyndons whatever. The haſty application too of ſpirits of wine, which is ſo commonly adviſed, cannot be proper; as they are not only unfit for inflammations in general, but alſo criſp up the veſſels of the *dura mater* and brain, and, ſtopping the ſuppuration, ſometimes produce a gangrene. Since then a cloſe application is inconvenient, and, whatever good there may be in topical medicines, it cannot for the moſt part be communicated to the abſceſs by reaſon of its extent

tent beyond the orifice, the beſt remedy will be dry lint only; which muſt be laid on looſely to give vent to the matter, and be repeated twice a-day till the diſcharge is leſſened, when once in twenty-four hours will be ſufficient to the finiſhing of the cure, which will be ſomething retarded by the exfoliations that ſometimes follow this operation. The patient afterwards may wear a plate of tin upon the ſcar, to defend it from blows or any accidental injury.

PLATE VIII.

The EXPLANATION.

A. The perforator, commonly called the *perforating trepan.* With this inſtrument an orifice is uſually made for the reception of the pin on the centre of the piece of bone that is to be taken away in the operation of trepanning; though, if the pin be very ſharp, and project but little beyond the teeth of the ſaw, as in that marked with the letter *B*, the perforator would be needleſs; but as the point of the pin preſently grows blunt with uſe, and in that caſe it is difficult to fix the ſaw, I think it is adviſable to have this inſtrument in readineſs. It is alſo handy for boring into the ſubſtance of the bones, in order to promote a granulation of fleſh on their ſurfaces;



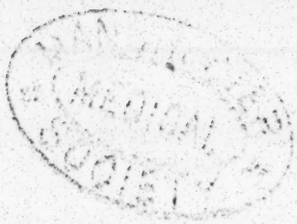
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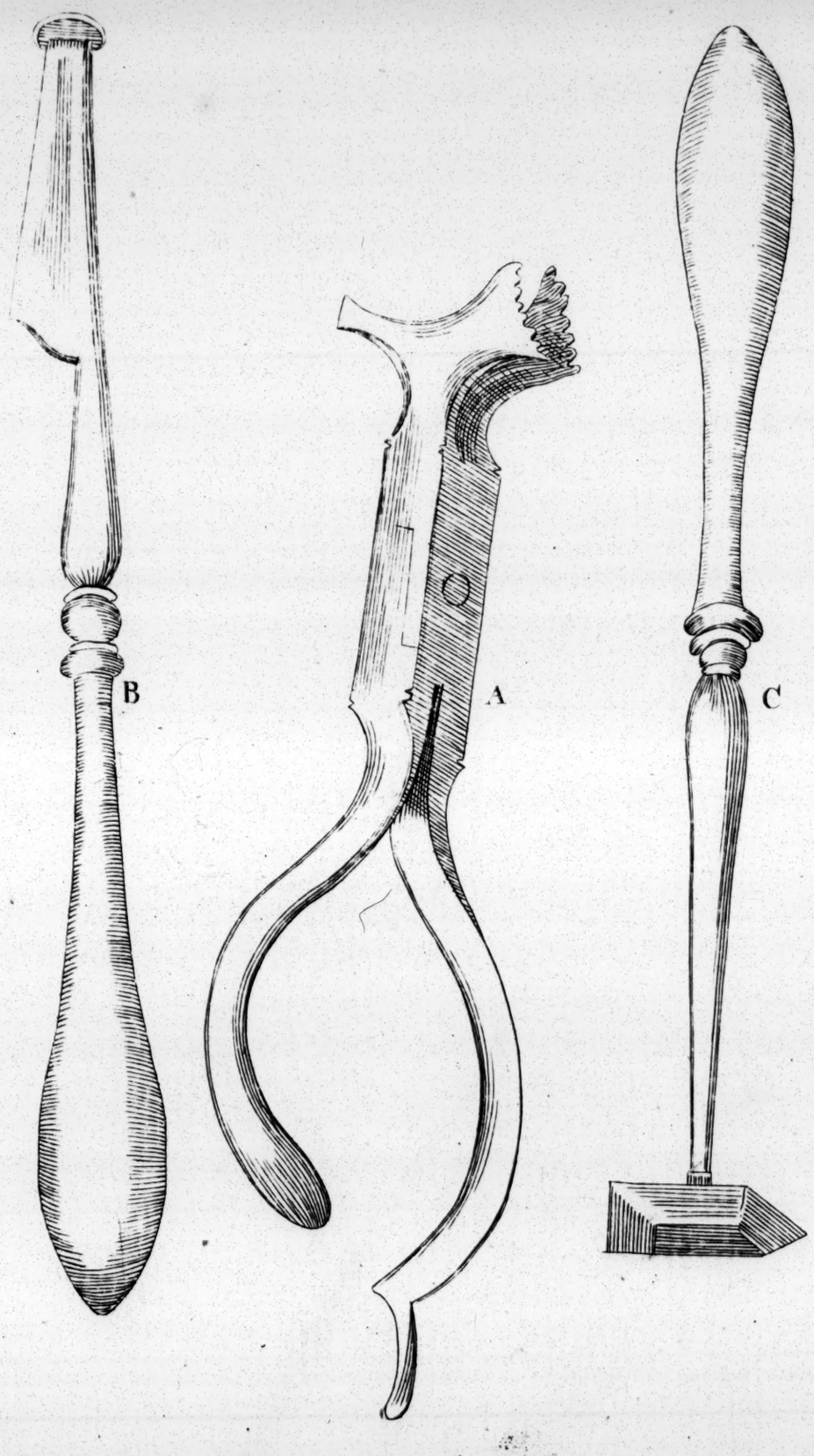
ſurfaces; when it is made uſe of, it muſt be received and faſtened in the handle *C.*

B. The crown or ſaw of the trepan, with the pin appearing juſt beyond the extremities of the teeth. It may be obſerved the ſhape of this ſaw is cylindrical, differing from thoſe in uſe, which are all conical, and ſome in a very great degree. Surgeons have generally conceived great advantages to ariſe from this form. Firſt, as the circumſtance of the utmoſt importance, they have imagined there would be danger of injuring the brain, by ſawing too ſuddenly through the *cranium*, if the enlargement of the ſaw did not increaſe the obſtruction, in proportion as they advanced towards it, and make the working of the inſtrument exceedingly ſlow. It has alſo been believed, that unleſs the ſaw was ſmaller near the teeth than towards its baſis, it would be impoſſible to incline it on any part where it had not made ſo deep an impreſſion as in others: in conſequence of which, one ſide of the circle would be ſawed through, and the membranes or brain injured; while on the other, perhaps, the ſaw would not have penetrated through the firſt table of the *cranium.* The laſt remarkable argument in favour of the conic ſaw, is, that it more readily admits, and afterwards retains, the ſawed piece of bone in its cavity. But I think all the advantages attributed to this figure are almoſt

imaginary; and the great labour of working ſo ſlowly and difficultly, is not only very inconvenient to an operator, but by no means ſerviceable to the operation: for notwithſtanding the ſaw be cylindrical, and works without any other impediment than what lies before the teeth, yet, even with this advantage, the operation goes on ſo gradually, that, from the experience I have had, I do not find the leaſt danger of ſuddenly paſſing through to the brain, as is apprehended, if we proceed with the caution of not leaning too hard on the inſtrument when the bone is almoſt ſawed through. And with reſpect to the impracticableneſs of inclining it on any particular part of the circle, when ſawed uneven, which is commonly alleged, whoever will try the experiment, will in a moment diſcover the falſeneſs of the aſſertion: beſides, the very inſtance ſtated overthrows this reaſoning; for if the circle has been already made deeper in one part than another, it muſt imply that we have leaned with more force on one part than another, and conſequently may at pleaſure do the ſame thing again. As to the laſt ſuppoſed advantage, of its receiving and retaining the ſawed piece of bone in its cavity, the benefit would be ſo frivolous, if it had truly the preference of the cylindrical one in that reſpect, that it would not be worth mentioning; but, in fact, the cylindrical ſaw

receives




B
A
C

receives the piece of bone very readily, and often retains it in its cavity.

C. The handle of the foregoing inſtrument, called the *trephine*, which is much preferable to the trepan (an inſtrument like a wimble uſed by joiners), becauſe of the great convenience of holding it, and leaning on one ſide or other of the ſaw as we find it neceſſary: the trepan, however, though allowed to be unhandy, is the inſtrument moſt uſed by ſurgeons in other parts of *Europe*, upon the ſuppoſition of its working quicker than the trephine.

I have repreſented the trephine of ſuch a ſhape as to make it a convenient elevator; for which purpoſe the extremities of it are made rough.

D. A key to take out the pin *E*, when the ſaw has made an impreſſion deep enough to be worked without the help of it.

E. The pin.

PLATE IX.

The EXPLANATION.

A. A convenient forceps to take out the circular piece of bone, when it does not ſtick to the ſaw. The contrivance by which they readily lay hold of it, is to make the extremities that are to graſp it, with an arch of the

ſame circle as the ſaw is made. Upon one of the handles there is added a little elevator, to lift up any ſmall ſplinter of bone; but it is not of much uſe.

B. A lenticular: the fore-part of its blade is ſharp, in order to ſcrape the lower edge of the orifice of the *cranium*, in caſe any ſplinters ſhould remain after the operation; and the button at its extremity receives the duſt, that it may not fall on the brain: but there is ſeldom any occaſion for this inſtrument, and I have never myſelf been under the neceſſity of uſing it.

C. A rugine, or raſpatory, which I have recommended for ſcraping bones, in order to promote granulations of fleſh. The handles of theſe two laſt inſtruments are wood, whereas every part of the others ſhould be made of ſteel.

CHAP. XXVIII.

Of the CATARACT.

THE cataract, called by the *Latins ſuffuſio*, is a diſeaſe of the cryſtalline humour, rendering the whole body of it opaque, ſo that the rays of light, which, in the natural ſtate of its tranſparency, were tranſmitted to the *tunica retina*, become now totally intercepted, and produce no effect. This is pretty

pretty nearly the account delivered down to us by *Hippocrates*, and the ancient *Greeks*, who likewiſe knew it by the name of *glaucoma*. *Galen* was perhaps the firſt who ſpecified any difference in defining the cataract to be a film ſituated behind the *iris*; and the *glaucoma*, a diſorder of the cryſtalline humour: which opinion, with very little alteration, has prevailed from his time down to the latter end of the ſeventeenth century, when there aroſe a diſpute on this diſtinction of *Galen*'s; ſome of the moderns aſſerting with *Hippocrates*, that the cataract is always a diſeaſe of the cryſtalline humour; and indeed with ſo much reaſon, that there is now hardly any one who doubts it: however, during theſe laſt forty years this ſubject has produced many arguments on both ſides.

The mathematicians having obſerved in thoſe who have been couched, that the defect of ſight remaining after the operation, anſwers nearly to what, in optics, the removing the cryſtalline humour would occaſion, have endeavoured to prove, that the operation muſt in conſequence be the depreſſing that humour, and leaving the eye to perform its function afterwards with the aqueous and vitreous only; which, wanting the denſity of that humour, will not refract the rays ſufficiently to re-unite them on the *retina*; whence patients, after their cure, are obliged to uſe convex

glaſſes, as ſubſtitutes for the depreſſed cryſtalline humour.

Dr *Petit*, a moſt accutare Anatomiſt of *Paris*, has, from a critical examination of the figure of the eye, argued againſt the poſſibility of a film's exiſtence in the poſterior chamber, by reaſon of the ſmallneſs of that chamber, or proximity of the cryſtalline humour to the back of the *iris;* and again, from the impracticability of diſlodging ſuch a film, without offending the ſound cryſtalline humour.

Laſtly, and what is more certain, Anatomiſts have frequently diſſected the eyes of perſons under this diſorder after their death, and have found it to be always an opacity of the cryſtalline humour; agreeably to the definition of a *glaucoma:* ſo that by conſequence we muſt underſtand the words *cataract* and *glaucoma* as ſynonymous terms, ſince they are, in fact, but one and the ſame diſeaſe.

I think it needleſs to ſtate the reaſons on the other ſide of the queſtion, as they are of little weight, and indeed almoſt univerſally exploded.

In deſcribing the nature of a cataract, it has hitherto been a poſitive maxim laid down by oculiſts of every nation, that there is one certain ſtage of the diſtemper, in which only the operation is proper; and this ſtate of the diſeaſe is ſaid to be maturity of the cataract.

They

They have compared it to the ripeneſs of fruits, and have ſuppoſed a regular change in the conſiſtence of the cryſtalline humour, from the moment it is affected. They ſay, the diſeaſe, upon its firſt invaſion, gradually liquefies the humour; and that, after its arrival to the utmoſt period of liquefaction, it then begins to acquire various degrees of tenacity, till at laſt it becomes perfectly hard, or, as they ſtyle it, horny: that the ſkill of the ſurgeon diſcovers itſelf, by fixing on that time for the operation, in which the fluidity of the cataract is no obſtacle to the depreſſion of it, from its want of reſiſtance to the needle; nor its hardneſs, from the elaſticity of its connecting fibres, which immediately return to their former poſition.

This, in a few words, is the general doctrine. But I think the regular alteration of the denſity of the cryſtalline humour is very much to be doubted: and for my part, I cannot help poſitively excepting to the rule here laid down; having not only ſeen cataracts of twenty or thirty years growth, often, upon the touch of the needle, prove ſoft and milky; but alſo many inſtances, in which a due degree of conſiſtence occurred after four or five months, I may venture to ſay days, when the cataract was the conſequence of a blow or puncture: both which caſes ſo little correſpond with this ſuppoſed change, that they

ſeem not only to overthrow it, but to imply that the cataract, after it has acquired its total degree of opacity, may frequently, if not generally, continue in the ſame ſtate of tenacity to the life's end. And tho' I will not take upon me to affirm that cataracts come always very early to their greateſt conſiſtence; yet this we may ſafely deduce from theſe obſervations, that whenever they become entirely opaque, we may properly undertake the operation: which has been my method of practice hitherto; nor do I find any reaſon to lay it aſide.

I ſhall, however, obſerve in this place, that, contrary to the recieved opinion, I have, upon examination, found cataracts of a proper conſiſtence to be couched long before they would have been opaque: but this only confirms what I have already laid down, that there is not ſuch a regular change in them as has been ſuggeſted, and that we may always venture on the operation when they are quite opaque; ſince it might be ſucceſsful, as I have here intimated, even before that time; though I ſhould never adviſe it, nor do I believe that patients would ſubmit to it, whilſt they enjoyed a certain degree of ſight.

Since, then, the *glaucoma* is no other diſeaſe than the cataract, we muſt at once diſcard the diſtinction of theſe two diſtempers, as merely imaginary; and from what has been

ſaid

ſaid with regard to the conſiſtence of a cataract, that, whatever it be, the removal of the humour is the ſole end of the operation, the diſtinction of a true and falſe cataract will appear equally frivolous; and conſequently moſt of the ſubdiviſions compriſed under this laſt, ſuch as the bag, the milky, the purulent, the doubtful, the membranous, the fibrous, the ſhaking, and many more, in the books on this diſeaſe; the greateſt part of which are names that puzzle the memory without informing the underſtanding, and indeed have not a ſufficient foundation in nature, but owe their diverſity of character more to the imagination of writers than to any real variety in the diſeaſe.

The general criterion of the fitneſs of cataracts for the operation is taken from their colour: the pearl-coloured, and thoſe of the colour of burniſhed iron, are eſteemed proper to endure the needle: the white are ſuppoſed milky; the green and yellow, horny and incurable. The black cataract is deſcribed by moſt authors; but, I dare ſay, has been miſtaken for a *gutta ſerena;* where no diſeaſe appearing, the pupil ſeems black, as in a natural ſtate of the eye. And as to the green one, I have not, as I remember, in a great number of cataracts, met with a ſingle inſtance of it: but poſſibly it may be in nature; and one would indeed imagine the deſcribers of it could

could not be miſtaken, in what muſt have been ſo evident.

The depreſſion of a cataract of any colour would be the cure, if that alone was the diſtemper of the eye; but it generally happens, that the yellow cataracts adhere to the *iris* ſo firmly, as to become immoveable: beſides, when they follow in conſequence of a blow, which is often the caſe, either the cells of the vitreous humour are ſo much diſturbed and broken, or the *retina* affected, that a degree of blindneſs will remain, though the cataract be depreſſed, and that one cauſe removed.

To judge whether the cataract adheres to the *iris:* If you cannot at once diſtinguiſh it by your ſight, ſhut the patient's eye, and rub the lids a little; then, ſuddenly opening it, you will perceive the pupil contract, if the cryſtalline humour does not prevent the action by its adheſion: and when this is the caſe in any kind of cataract, the operation can hardly be adviſed; though, where the adheſion has been ſlight, I have now and then performed it with ſucceſs.

Another conſideration of the greateſt moment, before undertaking the cure, is to be aſſured of the right ſtate of the *tunica retina:* which is very readily learnt, where there is no adheſion of the cataract, from the light falling between the *iris* and cryſtalline humour; which if the eye is not ſenſible of, it

is

is a certain indication of another malady, and abſolutely forbids the operation. Generally, this cataract takes its riſe from head-achs, convulſions, and nervous diſorders. How the eye perceives in this caſe, *vide* the copper-plate.

The operation for the ſoft ſpecies of cataract, which may perhaps properly be ſtyled milky, has been by ſome writers falſely ſaid never to ſucceed. Of this there are two ſorts: ſome where we do not perceive any membrane, but which are almoſt uniformly ſoft, and, admitting the needle through them as through water, are conſequently immoveable; and others where the humour is liquefied, and contained in its own membrane, now pretty much thickened by the diſeaſe, which laſt frequently does well; for, upon breaking the membrane, the fluid burſts out and precipitates, and the membrane itſelf, if it is not depreſſed, in proceſs of time ſhrinks into a ſmall compaſs, or waſtes quite away.

Whether the whole cataract after its ſubſiding continues to lie at the bottom of the eye, or is quite waſted by being ſeparated from its veſſels, I have never had an opportunity of knowing poſitively by diſſecting one that had been couched; but by what we ſee of thoſe which have not been totally depreſſed below the pupil, and continue in that ſtate for ever after, we may ſuppoſe that they only waſte a little.

little. I know one inſtance of a woman whoſe cataract, after couching, became quite looſe in the eye, and in an erect poſture ſunk to the bottom; but by ſtooping the head forward, ſhe could bring it quite over the pupil. On the other hand, I once couched a perſon, when, upon the firſt attempt to depreſs the cataract, it ſuddenly ſprung up, and made its way through the pupil into the anterior chamber of the eye; where I left it, without endeavouring to diſlodge it again. In about ſix weeks it began to diminiſh, and at the end of ten weeks was entirely waſted, and the patient ſaw extremely well.

When none of the objections I have ſtated forbid the operation, it may be thus done:—Having placed your patient in a convenient light, and in a chair ſuitable to the height of that you yourſelf ſit in, let a pillow or two be placed behind his back, in ſuch a manner that the body bending forward, the head may approach near to you; then inclining the head a little backward upon the breaſt of your aſſiſtant, and covering the other eye ſo as to prevent its rolling, let the aſſiſtant lift up the ſuperior eye-lid, and yourſelf depreſs a little the inferior one: this done, ſtrike the needle through the *tunica conjunctiva*, ſomething leſs than one tenth of an inch from the *cornea*, even with the middle of the pupil, into the poſterior chamber, and gently endea-

vour

vour to depreſs the cataract with the flat ſurface of it. If, after it is diſlodged, it ariſes again, though not with much elaſticity, it muſt again and again be puſhed down. If it is membranous, after the diſcharge of the fluid, the pellicle muſt be more broke and depreſſed: if it is uniformly fluid, or exceedingly elaſtic, we muſt not continue to endanger a terrible inflammation, by a vain attempt to ſucceed. If a cataract of the right eye is to be couched, and the ſurgeon cannot uſe his left hand ſo dexterouſly as his right, he may place himſelf behind the patient, and uſe his right hand.

I have not recommended the *ſpeculum oculi*, becauſe, upon the diſcharge of the aqueous humour through the puncture, the eye being ſomewhat emptied, more readily admits the depreſſion of the cryſtalline humour, than when preſſed upon by the inſtrument.

As to the method of treating the ſucceeding inflammation, (when it happens, for ſometimes there is none), I can adviſe nothing particular, but to refrain from thoſe *collyria* that are charged with powders; for the thinner parts flying off, leave a gritty ſubſtance in the eye, which muſt be pernicious. Bleeding, and other gentle evacuations, are found abſolutely neceſſary. The uſe of cool applications externally, is moſt eaſy to the eye; but, after all, there will ſometimes enſue a trouble-

troubleſome ophthalmy, which, with the uncertainty there always is of ſucceſs after the operation, have deterred moſt ſurgeons from undertaking it, and, till lately, from ſtudying the nature of the diſeaſe: but I fancy the operation will come into greater repute, when more generally practiſed by men of good character; for it is leſs the difficulty, than the abuſe of it by pretenders, which has brought it into diſcredit.

Since the publication of the ſixth edition of this treatiſe, a method of removing the cataract by opening the *cornea*, and extracting the cryſtalline itſelf, has been diſcovered. The experience of a little more time will evince whether it be preferable or not to the old operation. For the manner of performing it, and the ſucceſs attending it, I muſt refer the reader for the preſent to the *Philoſophical Tranſactions*, and to the third edition of my *Critical Inquiry*, where I have ſaid all I yet know on this ſubject.

CHAP. XXIX.

Of Cutting the IRIS.

THERE are two caſes where this operation may be of ſome ſervice; one, when the cataract is from its adheſion immoveable; and the other, when the pupil of the eye is totally

totally cloſed up by a diſorder of the muſcular fibres of the *iris*, which gradually contracting the orifice, at laſt leaves the membrane quite imperforate. This laſt diſtemper has hitherto been deemed incurable. The adheſion of the cataract I have ſpoken of in the preceding chapter, and conſidered it as a ſpecies of blindneſs not to be relieved: but Mr *Cheſelden* has invented a method of making an artificial pupil, by ſlitting the *iris*, which may relieve in both the inſtances here ſtated.

In doing this operation, the patient muſt be placed as for couching, and the eye kept open and fixed by the *ſpeculum oculi:* which is abſolutely neceſſary here, for the very reaſon I would diſcard it in the other; ſince the flaccidity of the membrane from the iſſue of the aqueous humour, would take away its proper reſiſtance to the knife, and make it, inſtead of being cut through, tear from the *ligamentum ciliare:* then introducing the knife in the ſame part of the *conjunctiva* you wound in couching, inſinuate it, with its blade held horizontally, and the back of it towards you, between the *ligamentum ciliare* and circumference of the *iris*, into the anterior chamber of the eye; and after it is advanced to the farther ſide of it, make your inciſion quite thro' the membrane: and if the operation ſucceeds, it will, upon wounding, fly open, and appear

pear a large orifice, though not ſo wide as it becomes afterwards.

The place to be opened in the *iris* will be according to the nature of the diſeaſe: if the membrane itſelf be only affected with a contraction, the middle part of it, which is the natural ſituation of the pupil, muſt be cut; but if there be a cataract, the inciſion muſt be made above or below the cataract, tho' I think it more eligible to do it above.

The contracted *iris*, from a paralytic diſorder, is ſo often complicated with an affection of the *retina*, that the ſucceſs is very precarious in this caſe. This operation, by what I have ſeen, has anſwered beſt in adheſions of the cryſtalline humour, though, to ſpeak truly, but very ſeldom even there. As I would not miſlead any one who ſhall practiſe an operation not yet much known in the world, I do confeſs, that either the danger of the *iris* ſeparating from the *ligamentum ciliare*, or of the wound not enlarging ſufficiently, do upon the whole make the event very doubtful. I once performed it with tolerable ſucceſs, and, a few months after, the very orifice I had made, contracted, and brought on blindneſs again. Since it has been diſcovered by the extraction of the cryſtalline, that a large wound may be made through the *cornea* without any bad conſequence, I ſhould imagine this operation would be much improved by

by introducing the knife perpendicularly through the *cornea* and *iris*, and cutting both at the ſame time, ſo that the inciſion of the *iris* ſhould be exactly in the ſame part and of the ſame dimenſions as by the other method.

In theſe two chapters I have not once uſed the word *uvea*, but have made mention of the *ligamentum ciliare* two or three times; both which parts are but little underſtood for want of proper explanation, but which muſt be rightly conceived of in order to underſtand what I have ſaid upon theſe diſeaſes.

The generality of anatomiſts call that membrane, which I have ſpoken of under the name of *iris*, the *uvea;* and its anterior *lamina*, the *iris:* others again call the membrane, *uvea;* and the colour of it, *iris:* but both one and the other diſtinction confound learners exceedingly, and take their riſe from a want of attention to the hiſtory of anatomy. The ancients, who have given moſt of the names we now employ in the deſcription of the eye, were verſed chiefly, if not altogether, in the diſſection of brutes; amongſt which, thoſe of the graminivorous kind have a party-coloured *choroides*, one half of it being dark, and the other of a light ſhining green; this laſt, from its reſemblance to an unripe grape, was called the *uvea*. But the ſucceeding writers amongſt the moderns, applying themſelves to

human diſſections only, and not duly conſidering the difference of the human *choroides*, which is nearly of an uniform colour, and of that above deſcribed, have retained the appellation, though we have not the thing. Hence has ariſen the great variety of miſapplication of this word, which ought no more to be adopted in the anatomy of the human eye, than the *tunica nictitans*, which is proper to certain beaſts and birds.

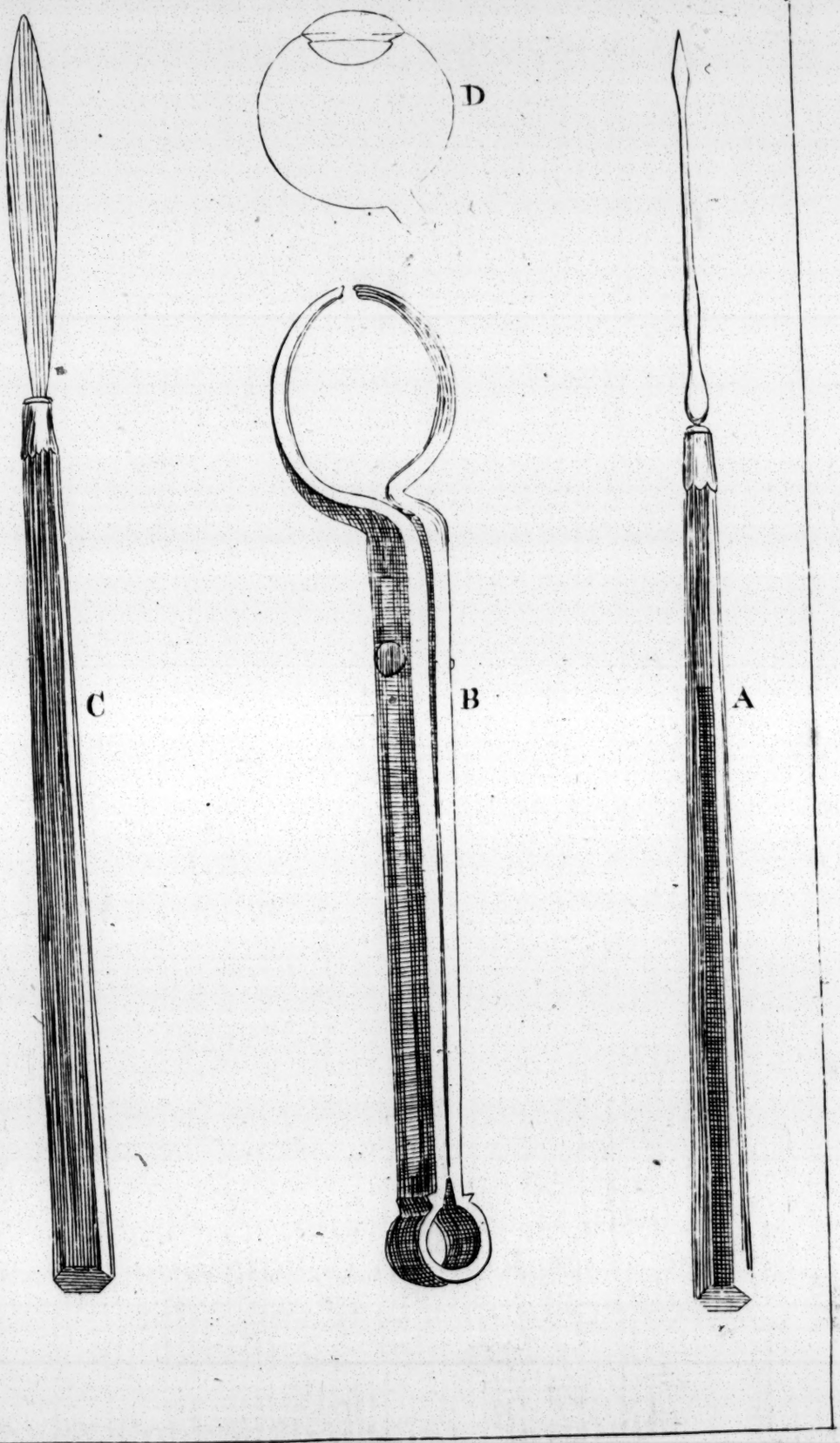
The *ligamentum ciliare* is that circular line on the globe of the eye, where the *ſclerotis*, *choroides*, *retina*, *cornea*, *proceſſus ciliares*, and *iris*, terminate; forming a whitiſh ring ſomewhat denſer than any other part of the coats: but ſince the inſtitution of this term the deſcription of the part it implies has been very much neglected, and the term itſelf confounded with the *proceſſus ciliares*; wherefore it was neceſſary to define it, that the proceſs of the operation of the *iris* might be better comprehended.

PLATE X.

The EXPLANATION.

A. The couching-needle; the broad part of which towards the point is flat on one ſide; but on the other, is a little convex, to give it more ſubſtance and ſtrength.

The handle of this inſtrument is white ivory,


D
C
B
A

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ivory, inlaid with a ſtreak of black in that part of it lying even with the convex ſurface of the blade: the meaning of which is, that by holding the handle with the ſtreak upwards, we may be guided to depreſs the membrane of a milky cataract with the flat ſurface, though the ſubſtance of the cataract ſwimming in the eye obſcures the needle, and prevents its being directed in a proper poſition by the ſight.

B. A *ſpeculum oculi*, which is made to open or ſhut by an iron button ſliding along a ſlit in the handle. This inſtrument is compoſed of one piece of ſteel, in ſuch a manner that it would fly open by its elaſticity, if the two branches of the handle were not confined by the button. The circle of it ſhould be covered with velvet, to make it lie ſofter in the eye-lids.

C. The knife for cutting the *iris*, the blade of which has two edges, reſembling a lancet, which are more advantageous than one only in cutting the *cornea* for the extraction of the cataract.

D. The figure of the eye.

The ſmall arch on the fore-part of the figure is the *cornea*; the two ſtraight lines tending to each other are the *iris*; and the opening between them is the *pupil*: the ſpace between the *cornea* and the *iris*, is the anterior chamber of the eye; the ſpheroidal body is the

cryſtalline humour; the ſpace between the *iris* and cryſtalline humour, is the *poſterior chamber*; and the two ſhort lines which ariſe from the meeting of the *cornea*, *iris*, &c. and run upon the cryſtalline humour, are the *proceſſus ciliares*. The deſign of this repreſentation is to ſhow the ſmallneſs of the poſterior chamber, and how ſome light may paſs obliquely between the *iris* and cryſtalline humour, thro' the interſtices of the ciliary proceſſes, and occaſion that degree of ſight which people with cataracts have.

CHAP. XXX.

Of the FISTULA LACHRYMALIS.

THE *fiſtula lachrymalis* is generally underſtood to be ſuch a diſorder of the canals leading from the eye to the noſe, as obſtructs the natural progreſs of the tears, and makes them trickle down the cheek: but this is only the firſt and mildeſt ſtage of the diſeaſe. In the next, there is a mucus reſembling matter, and afterwards matter itſelf diſcharged with the tears from the *puncta lachrymalia*, and ſometimes from an orifice broken thro' the ſkin between the noſe and angle of the eye. The laſt and worſt degree of it is, when the matter of the abſceſs, by its long continuance, has

has not only corroded the neighbouring ſoft parts, but alſo affected the ſubjacent bone.

For the better underſtanding the ſeat and nature of this diſtemper, I have here annexed a repreſentation of the *lachrymal* ducts.

In treating of the *fiſtula lachrymalis*, moſt writers mention the inflammation and ulceration of the *ſaccus*, as being ſometimes the immediate cauſes of it; but then they all ſuppoſe that the tears becoming acrid and corroſive, excite the inflammation and abſceſs; though many of them imagine that the tears themſelves, not finding a way through the naſal duct, do, from ſtagnating in the *ſaccus*, corrupt, and become the matter diſcharged by the *puncta lachrymalia*. But the latter opinion is moſt certainly ill-grounded; for beſides that the tears are not of a compoſition to become *pus*, it may be obſerved, almoſt at any time, upon preſſing the abſceſs, that the two fluids appear unmixed: and with regard to the general doctrine of the ſharpneſs of the tears producing the diſorder, I think it is much to be queſtioned; ſince the *cornea* and *tunica conjunctiva* being more ſenſible membranes than the *ſaccus*, would more readily be offended by them; but as we ſee they are not in the leaſt injured, and every part of an animal body is ſubject to inflammation, &c. from internal cauſes, I believe this external one may be juſtly doubted.

Whatever be the cauſe of the inflammation, whether the ſmall-pox, *lues venerea*, *&c.* the effect of it is an obſtruction of the *ductus ad naſum*. That a total obſtruction ſhould follow upon an inflammation in ſo large a veſſel as the naſal duct, I preſume is owing to its ſituation in the bony groove of the *os unguis*, which not allowing it to dilate in its inflammation and thickening, muſt neceſſarily make it fill up the whole channel, and cauſe that regurgitation of tears and matter which is the conſtant ſymptom of this diſeaſe.

Some years ſince, Monſieur *Annell*, a *French* ſurgeon, recommended, in the recent fiſtula, to paſs a ſmall probe through one of the *puncta lachrymalia* into the *ſaccus* and noſe, in order to break the concretions which were ſuppoſed to make the obſtruction, and with a ſmall pipe and ſyringe to throw an injection through the other, in order to waſh them away. This method was at firſt received with great applauſe, and ſtill continues to be practiſed by ſome very eminent ſurgeons: yet, by what I have been able to learn from the experiments of others, and the reaſon of the thing, I am by no means inclined to think favourably of the invention; for as the very characteriſtic of this ſtate of the fiſtula, is the reflux of the tears from the *ſaccus*, the channels leading to it from the *puncta lachrymalia* muſt be ſuppoſed clear: and as to the obſtruc-

tion

tion in the naſal duct, an injection thrown with ſo little force can hardly be imagined ſufficient to remove it; and ſtill leſs, if it be true that the obſtruction is not owing to any looſe ſubſtance clogging up the paſſage, but to an inflammation of the membranes.

If, then, the injection cannot aſſiſt by the force of its ſtream, the advantage muſt ariſe from its balſamic qualities; but no ſurgeon at this time dilates an abſceſs of any kind by injections when the *pus* is good-conditioned, and he can by compreſs diminiſh the cavity of it, as may be done in this very caſe, and which ſhould be practiſed before any other method is undertaken.—Indeed *Annell* and his followers, after the injection, applied a compreſs and bandage; to the good effects of which, rather than any of the other proceſſes, I am inclined to think the ſucceſs was owing.

When the quantity of matter returned by the *puncta* increaſes, notwithſtanding the uſe of compreſs, and the tumour of the *ſaccus* grows larger, it then becomes neceſſary to perform the operation; the deſign of which is to cure the ulcer, and make way for the tears into the noſe.

The general notion that the abſceſs of the bag always occaſions a caries of the *os unguis*, perhaps may have led ſurgeons into the method of deſtroying both *ſaccus* and bone with a perforating inſtrument, and afterwards

more effectually with an actual cautery, in order to remove the diſordered bone, and at the ſame time to make an artificial canal into the noſe. But as there are many inſtances of cure by a mere inciſion of the *ſaccus lachrymalis*, the rougher method of perforation ought not to be uſed, unleſs there is evidently a caries in the adjacent bone, or that, after the ulcer of the *ſaccus* is healed, the tears cannot be made to paſs through the duct; though, even in that caſe, the application of fire is not only generally uſeleſs, but often proves hurtful, and defeats the very end it was intended to promote. The deſign of the cautery, is to prevent the artificial canal made by the perforation from cloſing: but the operators who recommend it confeſs, that, in perſons who have been cauteriſed, even at the beſt the tears trickle down ever after; whereas that accident does not ſo often attend on thoſe where the inciſion only is practiſed. The reaſon of this difference may perhaps be more clearly explained by a parallel inſtance: if we divide a vein quite through, and cauteriſe its extremities, it is well known that the ſloughs formed by the fire, hardly ever ſeparate from the living parts of the vein, until they are totally cloſed up ſo as to prevent any effuſion of the circulating blood; the conſequence of which is, the breaking off the communication of the divided parts of the vein: whereas

whereas, if there was only an opening made with a ſharp inſtrument, or even a piece of the vein carried away by it, the divided parts would ſoon re-unite, and the circulation be continued through them. For the ſame reaſon, by the uſe of the cautery, the communication between the *puncta lachrymalia* and *ſaccus* will often be entirely deſtroyed; and the perforation into the noſe, though it remain open, will of conſequence not anſwer the purpoſe for which it was intended.

It may perhaps be ſaid, that by introducing the cautery through a *canula*, the upper part of the *ſaccus*, or opening of the *lachrymal* channels, may be protected from theſe ill effects. But I believe it will plainly appear, by the rudeneſs of the ſcar after the healing of the wound, how powerfully fire will work upon the neighbouring parts, notwithſtanding this precaution.

From what has been ſaid of the nature of this diſeaſe, the uſe of fire muſt be diſcarded in all the ſtages of it, and even perforation for the moſt part be practiſed only when the ſubjacent bone is carious. But this circumſtance is very rare; and for my own part, ſince I have doubted its frequency, it has not been my fortune to meet with a ſingle inſtance of it, though I have had fiſtulas of many years ſtanding under my care, in ſome of which the *pus* has found iſſue through the bag

bag and ſkin, and formed an external ulcer likewiſe. The reaſon why the inferior part of the *ſaccus* is not ſo often corroded as the ſuperior (in which caſe the bone would neceſſarily be affected) is, that here, as in every other part of the body, abſceſſes will break where they are leaſt under confinement, as in thoſe places they ſooner give way to the preternatural influx of the juices, and in conſequence becoming weaker will ſooner be deſtroyed. Snce, therefore, neither the long continuance of the diſeaſe, nor the great diſcharge of matter, are poſitive ſymptoms of a caries, we ought to be well ſatisfied of it by the feel of the probe before we perforate; but if, upon opening the bag, or in the courſe of the dreſſings, it appears the *os unguis* is bare, we are not to wait for an exfoliation, the bone being ſo very thin, but to break through with a ſmall perforator.

Many writers mention the ſucceſs of having ſometimes treated the *fiſtula lachrymalis* as a mere abſceſs of the *ſaccus*, though in general they recommend the uſe of fire: but when the abſceſs is ſo foul as not to cure by inciſion, a piece of the bag itſelf muſt be cut away; and thus *Celſus* treated the *fiſtula lachrymalis* (though he alſo uſed the cautery) without perforating.

The manner of operating in thoſe caſes where perforation is not required, in this:

Suppoſing

Suppoſing the abſceſs not broken, chooſe a time when it is moſt turgid with matter: and to this end, you may ſhut the patient's eye the day before, and lay little ſlips of plaſter upon one another acroſs the lids, from about the *puncta lachrymalia* to the internal angle; which compreſſing their channels, and preventing the flux of the matter that way, will heap it up in the bag, and indicate more certainly the place to be cut. If the abſceſs is already open, the orifice and probe will inform you where to enlarge: then placing the patient in a ſeat of convenient height for the management of your hand, with a ſmall inciſion knife dilate from the upper part of the bag down to the edge of the orbit, without any regard to the tendon of the orbicularis muſcle, or fear of wounding the blood-veſſels; though, if you ſee the veſſels, it is proper to ſhun them: the length of this inciſion will be near four-tenths of an inch. It has been adviſed in opening the bag, to introduce a ſmall probe through one of the *puncta* into its cavity, to prevent wounding the poſterior part of it: but I think this exceſs of care may be more troubleſome than uſeful; ſince, in ſo large a veſſel, a very ſmall ſhare of dexterity is ſufficient to avoid the miſtake. In making this inciſion, care muſt be had not to cut too near the joining of the eye-lids, becauſe of the deformity of the ſucceeding ſcar: though the

blear

blear eye, or uneven contraction of the ſkin in that part, after the operation, is generally owing to the uſe of the cautery, and not to the wound of the tendon of the orbicularis muſcle; for this laſt is neceſſarily, from its ſituation, always cut through, but without any inconvenience, becauſe of the firm cicatrix afterwards that fixes it ſtrongly to the bone.

When the bag is open, it is to be filled with dry lint, which the next day may be removed, and exchanged for a doſſil dipt in a ſoft digeſtive medicine: this muſt be repeated every day once or twice, according to the quantity of the diſcharge; now and then, when the matter is not good, uſing the precipitate medicine, and from time to time a ſponge-tent, to prevent the too ſudden re-union of the upper part of the abſceſs. When the diſcharge begins to leſſen, it will be proper to paſs a ſmall probe, a ſmall bougie, or ſilver wire, through the naſal duct into the noſe every time it is dreſſed, in order to dilate it a little, and make way for the tears and matter, which, by their drain, will continue to keep it open. This method muſt be followed till the diſcharge is nearly over (which will be in a few weeks); and then dreſſing ſuperficially with dry lint, or any drying application, the wound will ſeldom fail of healing.—After the cure, in order to prevent a relapſe, it will be

proper,

proper, for a few weeks, to wear the compreſſing inſtrument repreſented in the copperplate.

When the bone is bare, and the fiſtula requires perforation, the perforator is not to be carried down the *ductus ad naſum*, for fear of boring into the *ſinus maxillaris*; but more internally towards the noſe, which will bleed freely, if properly wounded: the wound afterwards ſhould be dreſſed with doſſils, in the manner above deſcribed, and the probe or ſilver wire be every day paſſed through the *ductus ad naſum*, leſt, after the cure of the abſceſs, it ſhould ſtill remain obſtructed; and if, upon trial, the duct ſhould be ſo filled up as not to admit the wire, it will be right to keep open the perforation into the noſe, with a ſmall tent, till the diſcharge is almoſt quite ceaſed.

I ſhall finiſh this chapter with obſerving, that though a weeping eye will ſometimes remain after the treatment of the *fiſtula lachrymalis*, yet the inconvenience of it is ſo ſmall, compared with a diſcharge of matter, that it would be happy if this was the worſt conſequence of the operation: but it ſometimes happens, that the ulcer, when healed, breaks out again; and ſometimes, too, that it cannot be quite healed by reaſon of the inferior part of the *ſaccus* and naſal duct lying ſo deep below the edge of the orbit, which makes the proper application of dreſſings to the bottom

of

of the ulcer more difficult. It is this ſituation of the *ſaccus*, that in a great meaſure prevents any good effects from burning and perforating, if the perforation only be dreſſed, as is very much practiſed, ſince the dreſſing will not be full four-tenths of an inch above the loweſt part of the ulcer.

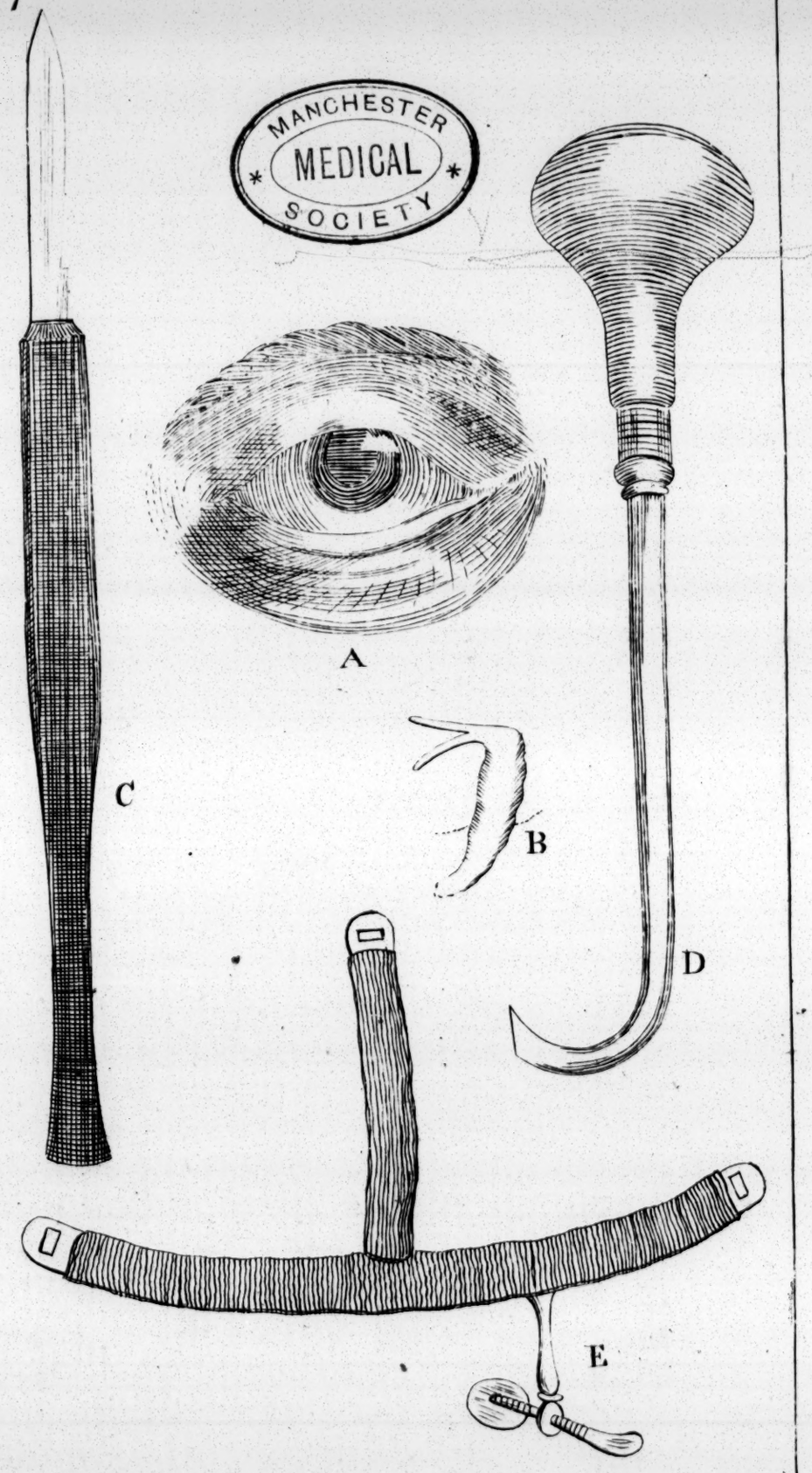
With regard to the trickling of the tears, though, generally ſpeaking, it is prevented by the method I have recommended; yet it does not appear at all wonderful it ſhould ſo frequently be the conſequence of the others, when we conſider how much at beſt the *ſaccus* contracts after a great deal of it has been deſtroyed; and how poſſible it is for the wound to fill up with granulations of fleſh, which cannot fail to prove an obſtacle to their paſſage into the noſe.

PLATE XI.

The EXPLANATION.

A. The eye, with the ſkin of the eye-lids denuded in order to ſhow the orbicularis muſcle: the white ſtreak running from the inner angle of the eye toward the noſe is called the tendon of the orbicularis muſcle, though I think it rather a ſmall ligament. At a little diſtance from the internal angle, on the edge of the eye-lids may be obſerved two black ſpots, which are the orifices of the lachrymal

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chrymal channels, and called the *puncta lachrymalia*.

B. The exact dimenſion of the lachrymal channels and bag. The pricked line repreſents the edge of the orbit. I have here taken care to ſhow the oblique direction of the bag, as it runs from the noſe towards the orbit.

From comparing this figure with the ſituation of the *puncta lachrymalia* in the foregoing one, it will appear that only the upper part of the bag lies under the tendon of the orbicularis muſcle, and conſequently is the only part wounded, and burnt through in the common operation, when the perforator is carried horizontally from the angle into the noſe, as is generally practiſed. And I believe the ſize of the bag here repreſented, though not ſo large as when it is diſeaſed, will at once ſhow the propriety of opening it firſt by an inciſion down to the orbit, or even farther, and then treating the fiſtula with the ſame dreſſings as we do other fiſtulous ulcers.

C. A ſmall inciſion-knife, more handy than a larger for opening the bag.

D. The perforator to deſtroy the *os unguis*, if ever it ſhould happen to be neceſſary.

E. An iron inſtrument, made thin and pliable, to ſet even on the forehead, and for uſe covered with velvet: the holes at the three extremities receive two pieces of riband, by which it is faſtened on the forehead: the button

button at the end of the ſcrew is to be placed on the *ſaccus lachrymalis*, and the ſcrew to be twiſted till the button makes a conſiderable preſſure on the bag: the button ſhould be covered with velvet, and a little compreſs of plaſter be laid on the bag before it is applied, to prevent the ſkin from being galled by the preſſure.—The little branch of iron which receives the ſcrew muſt be ſoft enough to admit of bending, otherwiſe it will be difficult to place the button exactly on the bag. This inſtrument is for the left eye only; it ſhould be worn night and day in the begining of a fiſtula, and after a fiſtula has been healed by inciſion: but as the ſucceſs depends upon the exact ſituation of the button upon the bag, it ſhould be carefully looked after.

CHAP. XXXI.

Of the BRONCHOTOMY.

THE operation of *Bronchotomy* is an inciſion made in the *aſpera arteria*, to make way for the air into the lungs when reſpiration is obſtructed by any tumour compreſſing the *larynx*, or ſome other diſorder of the *glottis* and *aſpera arteria*, without any apparent tumour. Theſe are the caſes in which it is ſuppoſed to be uſeful. But I am inclined to think it hardly ever can be of ſervice,

ſervice, but where the complaint is attended with ſome ſwelling, ſince I cannot find any inſtance to my ſatisfaction of good done by this operation in the other ſpecies of *angina*; nor has it appeared, upon examination of ſeveral who have died of it, that the air was obſtructed by any ſtricture of the *glottis* or *aſpera arteria:* if then the paſſage remains open, and reſpiration be diſturbed from other cauſes, the making a new orifice can be but of little advantage: I once performed it under this circumſtance; but it gave no ſort of relief.

Upon the whole then, I imagine the practice of this operation uſeful only in that ſpecies of *angina* where the throat is exceedingly enlarged by the ſwelling of the thyroid glan, and parts adjacent, called *bronchocele*, which, by their weight, may preſs upon the *trachea*, ſo as to make it in ſome degree narrower, and prevent the free courſe of the air to and from the lungs. But ſhould any one judge it proper in the inſtance I object to, the operation is ſo eaſy to perform, and ſo utterly void of any danger whatſoever, notwithſtanding the frightful cautions laid down by writers, that I would not altogether diſcourage the trial, till I have farther proof of its inſignificance.

The manner of doing it, is by making a longitudinal inciſion through the ſkin, three

quarters of an inch long, oppoſite to the third and fourth ring of the *trachea*, if you have the choice of the place; and when you cannot make it ſo high, the rule will be to wound a little below the tumour: it is always adviſed to pinch up the ſkin for this proceſs, which, however, may be left to the diſcretion of the ſurgeon. When the ſkin is cut thro', you muſt make a ſmall tranſverſe inciſion into the windpipe, and immediately introduce a ſilver crooked *canula* near half an inch long, with a couple of little rings at the top of it, through which a ribband may be paſſed round the neck, to keep it fixed in the wound.

Some have preſcribed making an inciſion through the ſkin and *trachea* at once, with a lancet or knife, as the more eaſy and expeditious method; and I once ſaw it performed in that manner, but it proved very inconvenient; for the windpipe in reſpiration moving up and down, ſlipped from the orifice of the ſkin, and made it very difficult to introduce the *canula* and afterwards to maintain it in its ſituation: wherefore I think it abſolutely neceſſary to make the internal inciſion longitudinal, and even pretty large, as I have directed above.

The caution laid down of raiſing the *ſternohyoidei* and *ſternothyroidei* muſcles, before cutting the windpipe, is not to be regarded; and

and as to the diviſion of the recurrent nerves and great blood-veſſels, ſo much aprehended in this operation, it is not in the leaſt to be feared, ſince they are quite out of the reach of the inſtrument, as any one ſkilled in the anatomy of thoſe parts muſt very well know.

The method of dreſſing will be eaſily underſtood, ſince, after the patient can breath by the natural paſſage, if you withdraw the hollow tent, the wound will become a ſimple one, and, notwithſtanding its penetration through a cartilage into a large cavity, require a ſuperficial application only.

CHAP. XXXII.

Of the Extirpation of the TONSILS.

THESE glands ſometimes grow ſo large and ſcirrhous as to become incurable, and even to threaten ſuffocation, if not extirpated. The manner of doing this operation formerly, was by cutting them off: but the almoſt conſtant conſequence of this wound was a violent bleeding, and ſometimes too a mortal one; on which account it is rejected in favour of the ligature, which is not only void of danger, but alſo ſeldom fails of cure.

If the baſis of the tonſil is ſmaller than the

upper part, you may paſs the ligature by tying it to the end of a probe, bent into the form of an arch, and ſet into a handle, which being carried beyond the gland, and round it, is to be brought back again: this done, you may eaſily tie it by the means of an inſtrument of Mr *Cheſelden*'s contrivance, which holds one end of the ſtring on the ſide of the tonſil next the throat, while you make the knot by pulling the other with the right hand quite out of the mouth, as will be eaſily underſtood by the draught in the copperplate. Should it happen that the tonſils are conical, ſo that the ligature will neceſſarily ſlip over its extremity when we attempt to tie, in this caſe he has recommended an inſtrument like a crooked needle, ſet in a handle, with an eye near the point threaded with a ligature, which is to be thruſt through the bottom of the gland; and being laid hold of with a hook, the inſtrument is to be withdrawn; then pulling the double ligature forwards, it muſt be divided, and one part tied above, and the other below the tumour: the knots are to be always double, and the ligature to be cut off pretty near them. However, to confeſs the truth, I have never in one inſtance been obliged to uſe this method: for where the tonſils have been conical, I have employed a very thin thread, which has cut into the ſubſtance of the gland a little, and, making

king a ſmall groove, prevented its ſliding over. If after four or five days they ſlip, or ſeem to have mortified the tonſil only in part, you muſt repeat the whole operation; and if it fail a ſecond time, you muſt even repeat it again, as I have ſometimes done, though it frequently happens that the cure is effected by the firſt operation.

This kind of extirpation is more practiſed in large piles, that are eſteemed incurable; and if the ſucceſs of it were better known, the operation would be much more frequent. I have by this method cured ſeveral people that have diſcharged blood every ſtool for many years, and ſome that have been almoſt quite deſtroyed by the repeated loſſes of it. When the piles are withinſide of the inteſtine, you muſt place your patient over a fomentation in a cloſeſtool, and have a crooked needle with a double ligature ready to paſs through them, when, by ſtraining, they are puſhed out of the *anus* (for ſometimes the inteſtine will return ſuddenly), and tie above and below, as in the inſtance of the tonſil.—Sometimes the piles are of that ſhape as to admit a ſingle ligature to be tied round them without the help of a needle, which is leſs painful: if there are ſeveral, you muſt only tie one or two at a time; for the pain of the ligature is exceſſive, and would be intolerable if many were tied at once:—however, every

five or ſix days, the operation may be repeated, till all are extirpated; and the parts muſt be kept ſupple by ſome emollient ointments.

When the piles are ſmall, they may ſafely, and with much leſs pain, be cut off; but when this method has been taken with very large ones, I have ſeen the patient in the utmoſt danger, from a violent effuſion of blood.

The *uvula* is ſubject to ſo great a degree of relaxation ſometimes, that it almoſt choaks the patient: the readieſt cure is cutting off all but half an inch of it, which may be done at one ſnip with a pair of ſciſſars (particularly curved for that purpoſe,) laying hold of it with a forceps, leſt it ſhould ſlip away. I once cut off a *uvula* that lay rolled upon the tongue about two inches: the patient recovered immediately, and never felt any inconvenience afterwards.

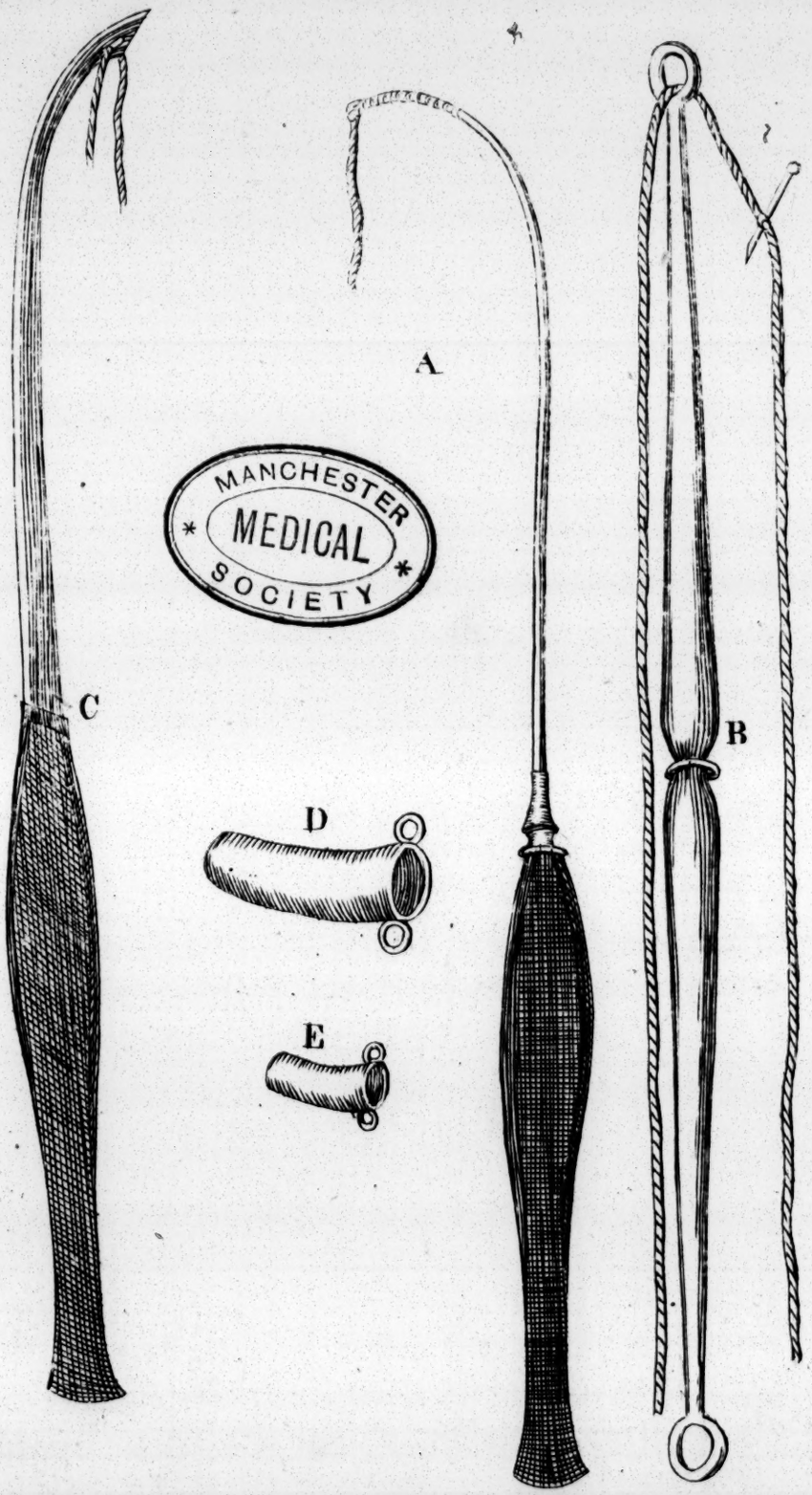
PLATE XII.

The EXPLANATION.

A. The bent probe fixed in a handle, with the ligature made of the ſame thread as the ligatures for tying the blood-veſſels.

B. The iron inſtrument for tying the tonſils.

I have here made a knot upon a pin, which is to be ſuppoſed in the ſituation of one of the tonſils, and may eaſily be imagined to have



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have been tied by puſhing the ſtring beyond it, when held firm by one hand againſt the inſtrument, and pulled by the other, on the outſide of the mouth.

This inſtrument is alſo of great ſervice in extirpating by ligature a ſpecies of ſcirrhus that ſometimes grows from the neck or cavity of the *uterus*.

C. The needle with the eye towards the point, for paſſing the ligature through the tonſil, when the baſis is larger than the extremity.

D. A *canula* made of ſilver, to be uſed in the *empyema*.

E. A *canula* to be uſed in *bronchotomy*.

To keep the *canulas* in their place, ſmall ribands may be paſſed through the rings of of them, and carried round the body and neck; or they may be held by a ligature run through and faſtened to a hole cut in a piece of ſticking plaſter, which is to be laid on each ſide of them.

CHAP. XXXIII.

Of the POLYPUS.

THE *polypus* of the noſe, is ſaid to be an excreſcence of fleſh, ſpreading its branches amongſt the *laminæ* of the *os ethmoides*, and through the whole cavity of one or both

noſtrils. It happens very often to both ſides of the noſe at once; and in that caſe is very troubleſome, almoſt ſuffocating the patient, at leaſt making reſpiration very difficult. The intent of the operation is the removal of this obſtacle; but as it is attended with different events from the variety of nature in the ſeveral ſorts of *polypuſes*, I ſhall endeavour to diſtinguiſh their ſpecies, ſo as to lead us into ſome judgment of the greater or leſs probability of ſucceſs.

They all ariſe from the membrane ſpread upon the *laminæ ſpongioſæ*, pretty nearly in the ſame manner as the *hydatids* of the *abdomen*, in one kind of dropſy, do from the ſurface of the liver; or as ganglions from the tendons, borrowing their coats from a production of its fibres and veſſels: if they appear ſoft, and of the colour of the *ſerum* of the blood, in all likelihood they are formed of ſuch a ſort of water contained in cyſts, which, upon breaking the membrane, leaves ſo little hold for the inſtrument, that but a ſmall part of it can be extracted afterwards. This *polypus* is to be left to harden before the operation be undertaken, which in proceſs of time it generally will do. In the next degree of conſiſtence, they retain pretty nearly the ſame colour, and are often partly watery, and partly of a viſcid texture, which, tho' not tenacious enough to admit of drawing them out by the roots,

roots, may at ſeveral attempts be taken away by bits. The next degree of conſiſtence, is that which is neither ſo ſoft as to be ſqueezed to pieces, nor ſo hard and brittle as to crumble, or adhere to the membrane with that force as not to admit of ſeparation: this is the moſt favourable one. The laſt is hard and ſcirrhous, adhering ſo tight as to tear rather than ſeparate in the extraction, and ſometimes even tends to degenerate into a cancer: this *polypus* is very difficult of cure.

The *polypus* ſometimes dilates to that degree, as not only to extend beyond the *os palati*, and hang over the *æſophagus* and *trachea*; but alſo ſpreading into the *ſinus maxillaris*, ſo exactly fills up every interſtice of the noſe, as to obſtruct the lower orifice of the *ductus ad naſum*, and prevent the deſcent of the tears, which neceſſarily muſt return through the *puncta lachrymalia:* and ſometimes they grow ſo enormouſly large, as even to alter the ſhape of the bones of the face.

When the *polypus* appears in the throat, it is always adviſable to extract it that way; it being found by experience, more ready to looſen when pulled in that direction, than by the noſe. To this end, it would be right, before undertaking the operation, to let your patient lie ſupine two or three hours, which will bring it ſtill farther down; for the body of the *polypus* does not univerſally adhere, and will

will by its weight ſtretch out the fibres, by which it is connected to the noſe; nay, there are inſtances where, by a little effort, ſuch as hawking, they have dropt quite off.

The method of extracting it is by a pair of forceps, with a ſlit at their extremities for the better hold, which muſt be introduced into the noſtril about an inch and a half, to make more ſure of it towards the roots; then twiſting them a little from one ſide to the other, you muſt continue in that action, while you pull very gradually the body of the *polypus*. If it break, you muſt repeat the extraction as long as any remains, unleſs it is attended with a violent hæmorrhage; which is an accident that ſometimes follows upon the operation, and ſeldom fails when the excreſcence is ſcirrhous. However, the ſurgeon is not to be alarmed at the appearance of an immoderate effuſion the moment after the ſeparation: for, generally ſpeaking, the veſſels collapſe very ſoon again; but if they do not, dry lint, or lint dipt in ſome ſtyptic, will readily ſtop it.

After the extirpation, it has been uſual, in order to prevent a relapſe, to dreſs with eſcharotic powders, and even to burn with the actual cautery: but neither the one or the other can be of great ſervice in this caſe, and both are painful and dangerous. If ever the uſe of corroſive medicines is adviſable, it ſhould be for deſtroying the remainder of a

polypus

polypus which cannot all be taken away: and then the eſcharotics may, in my opinion, be better conveyed to the part by a long tent, than a ſeton paſſed through the noſe and mouth, which is difficult to do without hurting the patient, and very naſty to bear; though this is the method at preſent practiſed, and recommended by ſome eminent ſurgeons.

CHAP. XXXIV.

Of the HARE LIP.

THIS diſeaſe is a fiſſure in the upper lip, with want of ſubſtance; and is a natural defect, the patient being always born with it, at leaſt that ſpecies of hare lip which requires the operation I am going to deſcribe. The cure is to be performed by the twiſted ſuture, the explanation of which I have reſerved for this chatper. There are many lips, where the loſs of ſubſtance is ſo great, that the edges of the fiſſure cannot be brought together, or at beſt where they can but juſt touch; in which caſe it need not be adviſed to forbear the attempt: it is likewiſe forbidden in infants, and with reaſon if they ſuck; but otherwiſe it may be undertaken with great ſafety, and even with more probability of ſucceſs than in others that are older, as I have myſelf experienced.

It

It is not uncommon for the roof of the mouth to be fiſſured likewiſe: but this is no objection to the operation, if the ſkin of the lip is looſe enough to admit of re-union: and it may be remarked, that the fiſſure of the palate, in length of years, cloſes ſurpriſingly in ſome caſes.

The manner of doing it is this:—You firſt with a knife ſeparate the lip from the upper jaw, by dividing the *frænulum* between it and the gums; and if the *dentes inciſorii* project, as is uſual in infants, they muſt be cut out with the ſame knife: then with a thin pair of ſtraight ſciſſars take off the callous edges of the fiſſure the whole length of it, obſerving the rule of making the new wound of it in ſtraight lines, becauſe the ſides of it can never be made to correſpond without this caution. For inſtance, if the hare lip had this ſhape,



the inciſion of the edges muſt be continued in ſtraight lines till they meet in the manner here repreſented.



The two lips of the wound being brought exactly together, you paſs a couple of pins, one pretty near the top, and the other as near the bottom, through the middle of both edges of it, and ſecure them in that ſituation by twiſting a piece of waxed thread croſs and round the pins ſeven or eight times; you muſt then cut off the points, and lay a ſmall

ſmall bolſter of plaſter underneath them, to prevent their ſcratching: but when the lower part only of the hare-lip can be brought into contact, it will not be proper to uſe more than one pin.

The pins I employ are made three-fourths of their length of ſilver, and the other part towards the point of ſteel; the ſilver pin is not quite ſo offenſive to a wound as a braſs or ſteel one: but a ſteel point is neceſſary for their eaſier penetration, which indeed makes them paſs ſo readily, that there is no need of any inſtrument to aſſiſt in puſhing them through. The practice of bolſtering the cheeks forward does little or no ſervice to the wound, and is very uneaſy to the patient; wherefore I would not adviſe the uſe of it. The manner of dreſſing will be to remove the applications, which are quite ſuperficial, as often only as is neceſſary for cleanlineſs. The method I would recommend, is to deſiſt the three firſt days, and afterwards to do it every day, or every other day: I do not think it at all requiſite to dreſs between the jaw and lip, where the *frænulum* was wounded, there being no danger that an inconvenient adheſion ſhould enſue. In about eight or nine days, the parts are uſually united, and in children much ſooner; when you muſt gently cut the threads, and draw out the pins, applying on the orifices a piece of plaſter and dry lint. It will be proper, in order

order to withdraw the pins more eaſily, to dab the ligatures and pins with warm water, and alſo moiſten them with ſweet oil, two or three days before you remove them; which will waſh off the coagulated blood, that would otherwiſe faſten them ſo hard to the ligature as to make the extraction painful.

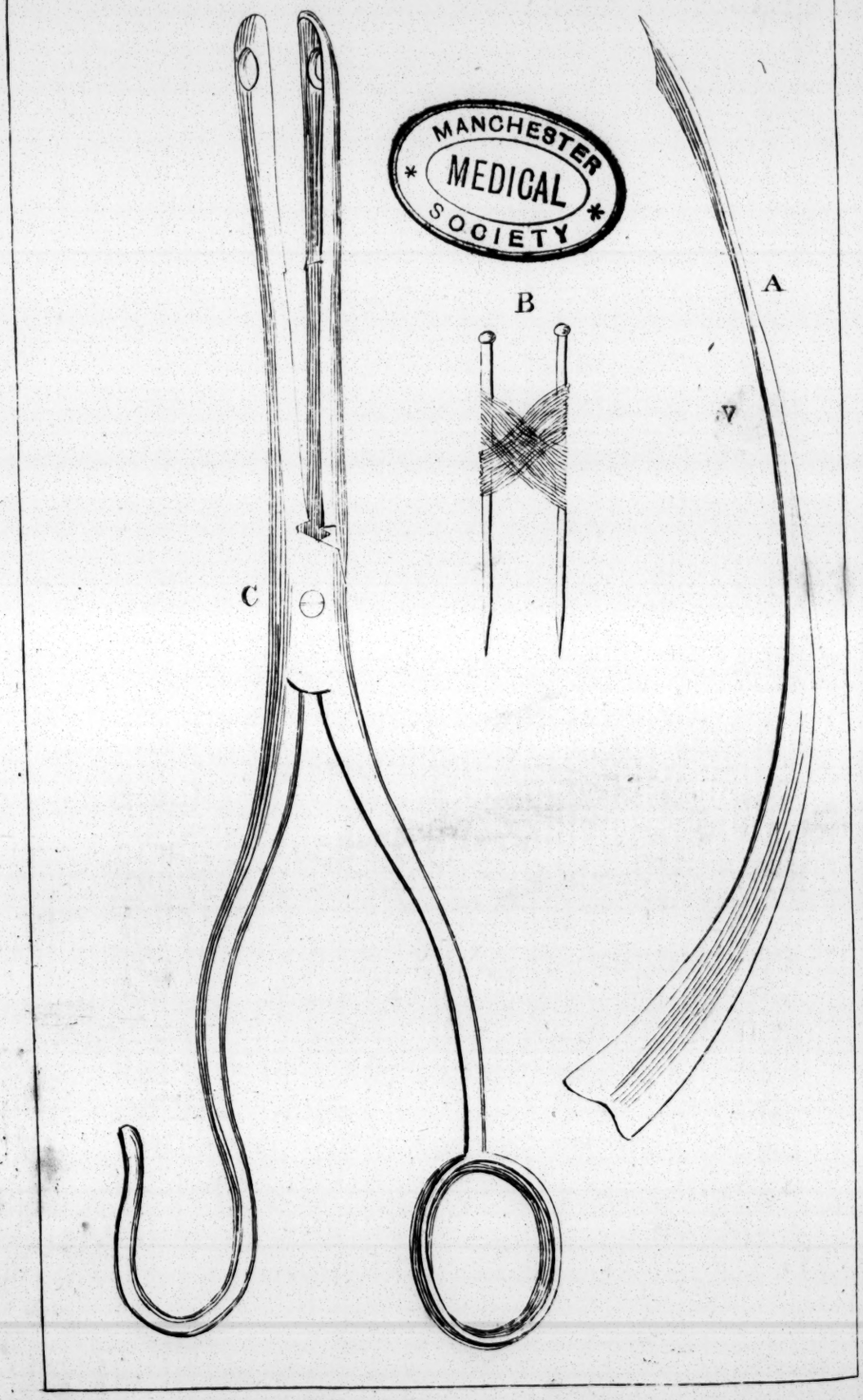
The twiſted ſuture is of great ſervice in fiſtulas of the *urethra* remaining after the operation for the ſtone; in which caſe the callous edges may be cut off, and the lips of the wound be held together by this method.

CHAP. XXXV.

Of the WRY NECK.

THE operation of cutting the wry neck is very uncommon, and is never to be practiſed but when the diſorder is owing to a contraction of the *maſtoidæus* muſcle only; as it can anſwer no purpoſe to ſet that muſcle free, by dividing it, (which is all that is to be done), if the others in the neck are in the ſame ſtate, and more eſpecially if it has been of long ſtanding from infancy; becauſe the growth of the *vertebræ* will have been determined in that direction, and make it impoſſible to ſet the head upright.

When the caſe is fair, the operation is this. Having laid your patient on a table, make a tranſverſe



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tranſverſe inciſion through the ſkin and fat, ſomething broader than the muſcle, and not above half an inch from the *clavicle;* then paſſing the probed razor with care underneath the muſcle, draw it out and cut the muſcle. The great veſſels of the neck lie underneath; but I think, when we are aware of their ſituation, the danger of wounding them may be avoided. After the inciſion is made, the wound is to be crammed with dry lint, and always dreſſed ſo as to prevent the extemities of the muſcle from re-uniting; to which end, they are to be ſeparated from each other as much as poſſible by the aſſiſtance of a ſupporting bandage for the head, during the whole time of the cure, which will generally be about a month.

PLATE XIII.

The EXPLANATION.

A. The inſtrument called the probe-razor, to cut the *maſtoidæus* muſcle in the wry neck; and is ſharp only about half its length, at that end where the blade is broad.

B. The two pins with the twiſted ſuture, uſed in the hare-lip.

C. The *polypus* forceps, with one of the rings open for the reception of the thumb, which would be cramped in pulling the forceps with much force, if it were received in the

the ſame ſort of ring as in the other handle. It is for this reaſon I have repreſented the ſtone forceps with open rings.

CHAP. XXXVI.

Of the ANEURISM.

THIS is a diſeaſe of the arteries, in which, either by a preternatural weakneſs of any part of them, they become exceſſively dilated; or, by a wound through their coats, the blood is extravaſated amongſt the adjacent cavities. The firſt ſpecies of *aneuriſm* is incident to every part of the body; but does not often happen, except to the curvature of the *aorta*, which is ſubject to this diſorder from the extraordinary impulſe of the blood on that part: from the curvature, it runs upwards along the carotids or ſubclavians, generally increaſing, till by its great diſtenſion it is ruptured, and the patient dies.

There have been great diſputes amongſt writers concerning the nature of this dilatation of the artery; ſome even denying the fact, and ſuppoſing it always a rupture; ſome, that all the coats are diſtended; others, only the external one; and again others, whoſe doctrine has been the beſt received, that the internal coat was ruptured, and the external dilated: theſe laſt have ſupported their hypo-

theſis

theſis with arguments drawn from the Anatomy of the internal coat, which is ligamentous and incapable of much diſtenſion; ſo that if an artery be inflated with a ſufficient force, the air will burſt that coat, and expand the external one, that is, make an artificial *aneuriſm*, in the ſame manner as blood is ſuppoſed to make a natural one. But this argument is of little force, when we conſider, that there are many parts of an animal-body, which violence cannot ſtretch conſiderably, but which, by the gradual influx of the juices, become ſuſceptible of monſtrous diſtenſion, as is the caſe of the *uterus;* and, upon obſervation, is evidently the caſe likewiſe of all the coats of the artery, as I have had an opportunity to examine in ſeveral *aneuriſms* in the collection of the late Dr *Douglas*, which he was ſo kind as to lend me for that purpoſe.

There are ſeveral hiſtories given of *aneuriſms* of the curvature of the *aorta*, in ſome of which the veſſel has been ſo exceſſively dilated, as to poſſeſs a great ſpace of the upper part of the *thorax;* and the moſt curious circumſtance to be gathered from them is, that the ſpot of the veſſel which is weakeſt, and where the diſeaſe begins, generally gives way in ſuch a manner to the force of the blood continually puſhing it outwards, as to form a large pouch or cyſt, with coats nearly as thick as thoſe of the artery itſelf: however,

the thickneſs of the coats of theſe cyſts will laſt but to a certain period; for when the veſſels of the coats can no longer conform to the extenſion, the circulation grows languid, the cyſt becomes thinner at its apex, and ſoon after burſts.

From this deſcription of the cyſt, it will be underſtood to reſemble the bladder, having a large cavity, and a narrow neck or opening.

The ſymptoms of this *aneuriſm*, are a ſtrong pulſation againſt the *ſternum* and ribs, every *ſyſtole* of the heart; and when it extends above the *ſternum*, a tumour with pulſation: upon diſſection, the ribs, *ſternum*, and *clavicle*, are ſometimes found carious, from the obſtruction of the veſſels of the *perioſteum*, which are preſſed by the tumour. What are the cauſes of a particular weakneſs in any of the coats of the artery, I cannot take upon me to determine: but it is worth obſerving, that the dilated *aorta* every where in the neighbourhood of the cyſt, is generally oſſified; and indeed oſſifications or indurations of the artery appear ſo conſtantly in the beginnings of *aneuriſms* of the *aorta*, that it is not eaſy to jndge whether they are the cauſe or the effect of them.

What I have ſpoken of hitherto, has been only the *aneuriſm* of the *thorax* from an internal diſorder. *Aneuriſms* of the extremities, are, for

for the moſt part, owing to wounds; though, when they happen of themſelves, they differ very little from the deſcription I have given of that in the *thorax*. The farther ſymptoms of them are (beſides pulſation), the tumour's being without diſcolouration in the ſkin; its ſubſiding when preſſed by the hand, and immediately returning when the hand is taken away; though, if it be upon the point of burſting, the ſkin will grow inflamed, and the coagulated blood in the cyſt will ſometimes make the pulſation much leſs perceptible.

This ſpecies of *aneuriſm* may ſometimes be ſupported a great number of years, if we reſiſt its dilatation by proper bandage: but if we do not there is danger of its burſting; and, if it be pretty large, of rotting the adjacent bones.

A ſound artery, wounded through part of its external coat, would, in all probability, produce nearly the ſame appearances as where the whole coat is weakened from an internal indiſpoſition: and this moſt likely is the caſe after bleeding in the arm, when it has not been immediately perceived that the artery was pricked, and the tumour has begun to form ſome days after the puncture; though the common appearance of an *aneuriſm* from the wound of a lancet, is a diſcharge of blood firſt through the orifice of the ſkin, and,

upon being ſtopt from bleeding outwardly, an inſinuation of it among all the muſcles, as far as it can ſpread, in the ſhoulder and arm: here the arm grows livid from the *ecchymoſis*; and the blood coagulating to the conſiſtence of fleſh, prevents any ſenſible pulſation. The cyſt which ariſes near the orifice of the artery is formed by the cellular capſula enveloping the veſſels of that part, and a portion of the *aponeuroſis* of the biceps muſcle, which admitting of ſome extravaſated blood underneath it, become exceſſively thickened and expanded. Theſe membranes muſt make the cyſt, otherwiſe we could not, upon opening the tumour in the operation, diſcover ſo readily the puncture; or if the coats of the artery made it, we could not ſeparate it diſtinctly from the veſſel, which would be always dilated above and below the cyſt, as we ſee in other *aneuriſms*.

There are ſome few inſtances of ſmall *aneuriſms* and punctures of the artery from bleeding, doing well by bandage: but they almoſt all require the operation at laſt, which is to be performed nearly in the ſame manner in every part; and, ſuppoſing it in the bend of the arm, is to be done after the following method.

Having applied the tourniquet near the ſhoulder, and laid the arm in a convenient ſituation, make an inciſion on the inſide of the

biceps

biceps muſcle, above and below the elbow a conſiderable length, which being in the courſe of the artery, will diſcover it as ſoon as you have taken away the coagulated blood, which muſt be all removed with the fingers, the wound being dilated ſufficiently for that purpoſe. If the orifice does not readily appear, let the tourniquet be looſened, and the effuſion of blood will direct you to it: then carefully carrying a crooked needle with a ligature under it, tie the veſſel juſt above the orifice, and paſſing the needle again, make a ſecond ligature below it, to prevent the return of the blood, and leave the intermediate piece of the veſſel to ſlough away without dividing it. To avoid wounding or tying the nerve in making the ligature, the artery may be cleared away from it firſt, and held up with a hook; but ſhould the nerve be tied with the artery, no great inconvenience would enſue from it. After the operation, the arm muſt be laid eaſy, on a pillow in bed, and the wound be treated in the common method, keeping it in that poſture a fortnight or three weeks, eſpecially if it ſhould ſwell much, and not digeſt kindly.

In doing this operation, it will be proper to have the amputating inſtruments ready, leſt it ſhould be impracticable to tie the artery, (though I have never met with ſuch an inſtance). And even after having tied it, the

arm muſt be carefully watched, that in caſe of a mortification it may be taken off; which, though from experience we learn is very ſeldom the conſequence, ſhould to all appearance be the perpetual one: for theſe *aneuriſms*, following always upon bleeding the *baſilic* vein, muſt neceſſarily be *aneuriſms* of the *humeral* artery near an inch above its diviſion; which being obſtructed by the ligature, one would think, ſhould neceſſarily bring on a mortification; but we ſee the contrary, though for ſome time after the operation we can hardly diſtinguiſh the leaſt degree of pulſe, and ever after it continues languid. If the *humeral* artery happens to divide above the elbow, which is not very uncommon, the proſpect of cure is better, and the pulſe will be ſtronger after the operation.

CHAP XXXVII.

Of AMPUTATION.

A Spreading mortification has been always eſteemed ſo principal a cauſe for amputation, that it is a faſhion with writers to treat of the nature of a gangrene, previous to the deſcription of this operation; and I think they have all agreed, that whatever the ſpecies of it be, if the remedies they preſcribe do not prevent its progreſs, the limb

limb muſt be amputated. However, this operation is ſpoken of as frequently unſucceſsful; and in length of time, its want of ſucceſs has been ſo unqueſtionably confirmed by repeated experiments, that ſome of the moſt eminent practitioners here in *England*, make that very circumſtance an exception to the operation, which ſo few years ſince was the great inducement; and the maxim now is, never to extirpate till the mortification is abſolutely ſtopped, and even advanced in its ſeparation.

Gangrenes may be produced two ways; either by indiſpoſition of body, or by accident in a healthful ſtate. For as the life of a part depends upon the circulation of its fluids, whatever ſhall make the circulation ceaſe, will inevitably occaſion a gangrene: thus a mere compreſs preventing the courſe of the blood, as effectually cauſes a mortification as any indiſpoſition in the fluids or veſſels.

It frequently happens in old age, that the arteries of the lower extremities oſſify; which deſtroying their elaſticity, muſt in conſequence produce a gangrene in the toes firſt, and afterwards in the limb nearly as high as where the oſſification terminates; ſo that in mortifications ariſing from this cauſe, we at once ſee why amputation during their increaſe is of ſo little ſervice, unleſs perfor-

med above the oſſification. But we have no way to judge where the oſſification ends, but by the inference we make from the gangrene's ſtopping: hence we may learn the propriety of our modern practice in this caſe.

If by any accident the limb has been injured to that violent degree as to begin to mortify, it will be no more fit to operate here till it ſtops, than in the other inſtance; becauſe all parts that are mortified have had the diſpoſition to become ſo before the effect is produced: and cutting off a limb, half an inch above the abſolute dead ſkin, is generally leaving a part behind, with the ſeeds of a mortification in it; ſo that, unleſs we can be ſure the veſſels are not affected to the place of amputation, which will be hard to know but from the conſequence, the operation will be uſeleſs.

Sometimes the fluids of the body are ſo vitiated, as to looſe their proper nutritious qualities; and the limb becomes gangrened, not from any alteration in its veſſels, but chiefly from its ſituation, which being at a great diſtance from the heart, will be more prone to feel the ill effects of a bad blood than any other part, as the circulation is more languid in the extremities: and it ſeems not very improbable, that, in ſome diſpoſitions of the blood, a mortification may alſo be a kind of critical diſcharge. When therefore

a

a gangrene ariſing from either of theſe cauſes is running on, amputation above it will, for the moſt part, be uſeleſs, ſince it is only removing one degree of the effects of the bad juices, and leaving them in the ſame ſtate to produce the like miſchief in other parts. Thus we ſee after amputations on this account, the gangrene ſometimes falls on the bowels, or the other extemities: from which obſervation, I think, we may conclude it not ſafe to amputate, till the fluids are altered; and this alteration will preſently diſcover itſelf by the ſtopping of the mortification.

I have laid it down as a rule, that the mortification ſhould not only be ſtopped, but advanced in its ſeparation; the reaſon of which is, that tho' the blood is ſo much altered for the better as to occaſion a ſtoppage of the gangrene, yet at this point of alteration it is ſtill in a bad ſtate, and ſhould be left to mend, with the utmoſt tranquillity of body and aſſiſtance of cordial medicines, till ſuch time as granulations of fleſh upon the living part of the extremity ſhew the balſamic diſpoſition of the blood: in the mean while, to take off the ſtench of the gangrene, it may be wrapt up in ſpirituous or odoriferous applications. I have ſeen ſome limbs taken off immediately upon the mortification's ceaſing, when afterwards the patients have ſunk from frequent effuſions of blood, not diſcharged by

by the great veſſels, but the whole ſtump:—theſe hæmorrhages I conceive were owing to the thinneſs of the blood, which hardly gave a reddiſh tincture to the cloths and bandages. On the other hand, upon waiting a conſiderable time after the ceaſing of the mortification, I have taken off ſome myſelf with as good ſucceſs as for any other diſorder.

Gunſhot-wounds, compound fractures, and all ſudden accidents requiring amputation, are attended with the beſt ſucceſs, if immediately performed. Diſorders of the joints, ulcers of long ſtanding, and all ſcrophulous tumours, do ſometimes return on other parts after the operation. When a leg is to be amputated, the manner of doing it is this.

Lay your patient on a table two feet ſix inches high; which is much better than a low ſeat, both for ſecuring him ſteady, and giving yourſelf the advantage of operating without ſtooping, which is not only painful, but inconvenient in the other ſituation. While one of the aſſiſtants holds the leg, you muſt roll a ſlip of fine rag, half an inch broad, three or four times round it, about four or five inches below the inferior extremity of the *patella:* this being pinned on, is to ſerve as a guide for the knife, which, without it, perhaps would not be directed ſo dexterouſly. The manner of rolling has always been perpendicular to the length of the leg: but having

ſometimes

ſometimes obſerved, that though the amputation at firſt be even, yet afterwards the *gaſtrocnemius* muſcle contracting, draws back the inferior part of the ſtump more ſtrongly than the other muſcles can do the reſt of it, I have lately, in order to preſerve the regularity of the cicatrix, allowed for this exceſs of contraction, and made the circular inciſion in ſuch a manner that the part of the wound which is on the calf of the leg is a little farther from the ham than that on the ſhin is from the middle of the *patella*.

In the mean time, one of your aſſiſtants muſt carry a ſtrong ligature round the thigh, about three or four inches above the *patella*, which paſſing through a couple of ſlits in a ſquare piece of leather, he muſt twiſt with a tourniquet, till the artery is ſufficiently compreſſed to prevent any great effuſion of blood; and to do it more effectually, he may lay a bolſter of tow or linen under the ligature, upon that part where the artery creeps. It will alſo be a little more eaſy to the patient, to carry a compreſs of linen, three or four times double, round the thigh, on that part where the ligature is applied, in order to prevent it from cutting the ſkin.

The courſe of the blood being ſtopped, you muſt begin your inciſion juſt below the linen roller, on the under part of the limb, bringing your knife towards you, which at one

ſweep

ſweep may cut more than the ſemicircle; then beginning your ſecond wound on the upper part, it muſt be continued from the one extremity to the other of the firſt wound, making them but one line. Theſe inciſions muſt be made quite through the *membrana adipoſa*, as far as the muſcles; then taking off the linen roller, and an aſſiſtant drawing back the ſkin, as far as it will go, you make your wound from the edges of it when drawn back, through the fleſh to the bone, in the ſame manner as you did through the ſkin. Before you ſaw the bones, you muſt cut the ligament between them with the point of your knife: and the aſſiſtant who holds the leg while it is ſawing, muſt obſerve not to lift it upwards, which would clog the inſtrument; and at the ſame time not to let it drop, leſt the weight of the limb ſhould fracture the bone before it is quite ſawed through.

In amputating below the knee, it is of advantage to ſtand on the inſide of the leg; becauſe the *tibia* and *fibula* lie in a poſition to be ſawed at the ſame time, if the inſtrument be applied externally:—whereas, if we lay it on the inſide of the leg, the *tibia* will be divided firſt, and the *fibula* afterwards; which not only lengthens the operation, but it is alſo apt to ſplinter the *fibula* when it is almoſt ſawed through, unleſs the aſſiſtant be very careful in ſupporting it.

When

When the leg is taken off, the next regard is to be had to the ſtopping the blood; which muſt be effectually done before the patient is put to bed, or there will be great danger of bleeding again, when the fever is excited, and the veſſels of the ſtump dilated; both which happen a very little while after the operation. There is no method for this purpoſe ſo ſecure, as taking up the extremities of the veſſels with a needle and ligature in the following manner. As ſoon as the amputation is performed, the aſſiſtant muſt looſen the tourniquet for a moment, upon which the orifices of the arteries will appear by the iſſue of the blood. The operator having then fixed his eye upon one of the largeſt veſſels, paſſes a crooked needle through the fleſh, a little more than a quarter of an inch above the orifice, and about the ſame depth, in ſuch a direction as to make nearly one third of a circle round the veſſel: then withdrawing the needle, he a ſecond time paſſes it into the fleſh and out again, in the ſame manner and about the ſame diſtance below the orifice of the veſſel: by this means, the thread will almoſt encompaſs the veſſel, and when it is tied (which ſhould be done by the ſurgeon's knot) will neceſſarily incloſe it within the ſtricture. All the conſiderable arteries are to be taken up in the ſame manner:—that is, the tourniquet is to be looſened in order to diſcover

diſcover the veſſel, and then the needle is to be paſſed round it as I have here deſcribed. This is a much better way than uſing the artery forceps, where the veſſels are apt to ſlip away out of the ligature: and as to ſtyptic applications, their want of ſafety is ſo well known now, that the uſe of them, in hæmorrhages from large veſſels, is almoſt univerſally rejected; though it is thought by ſeveral ſurgeons who have experienced the virtue of agaric, that it will be found to be a more powerful aſtringent than any hitherto diſcovered.

It ſometimes happens in a large ſtump, that ten or more veſſels require tying: which done, you muſt apply looſe dry lint to the wound; or, in caſe the ſmall veſſels bleed plentifully, you may throw a handful of flour amongſt the lint, which will contribute to the more effectual ſtopping up their orifices. Before you lay on the pledgit, you muſt bind the ſtump, and begin to roll from the lower part of the thigh down to the extremity of the ſtump. The uſe of the roller, is to keep the ſkin forwards, which, notwithſtanding the ſteps already taken to prevent its falling back, would in ſome meaſure do ſo, unleſs ſuſtained in this manner. The dreſſing may be ſecured by the croſs cloth and gentle bandage; and the method of treating the wound may be

be learnt from what has been ſaid with reſpect to recent inciſed wounds.

Before the invention of making the double inciſion I have juſt now deſcribed, the cure of a ſtump was always a work of length of time: for by cutting down to the bone at once, and ſawing it directly, the conſequence was, that the ſkin and fleſh withdrew themſelves, and left it protruding out of the wound two or three inches in ſome caſes; ſo that it rarely happened, that an exfoliation did not follow, which beſides being tedious, alſo frequently reduced the wound to an habitual ulcer, and at beſt left a pointed ſtump, with a cicatrix ready to fly open upon the leaſt accident. All theſe inconveniences are avoided by this new method; and I know not of any objection to it, unleſs that the pain of making the wound is ſuppoſed to be twice as much as in the other, becauſe of the double inciſion: but when we conſider, that we only cut the ſkin once, and the fleſh once, though not in the ſame moment, I fancy upon reflection, the difference of pain will be thought inconſiderable.

It muſt be confeſſed, however, that notwithſtanding we derive ſuch benefits from the double inciſion, the contractile diſpoſition of the muſcles, and perhaps of the ſkin itſelf, is ſo great, that, in ſpite of any bandage, they will retire from the bone, eſpecially in the

the thigh, and ſometimes render the cure tedious.

To remove this difficulty, I have lately in amputations of the thigh made uſe of the croſs-ſtitch; which I would adviſe to be applied in the following manner.

Take a ſeton-needle, and thread it with about eight threads of coarſe ſilk, ſo that when they are doubled the ligature will conſiſt of ſixteen threads, about twelve or fourteen inches long: wax it pretty much, and range the threads ſo that the ligature may be flat, reſembling a piece of tap; after which oil both it and the edge of the needle. The flatneſs of the ligature will prevent its wearing through the ſkin ſo faſt as it would do if it was round, and the oil will facilitate its paſſage. Then carry the needle through the ſkin, at about an inch from the edge of the ſtump, and out again on the inſide of the ſtump; after which it muſt be paſſed through the oppoſite ſide of the ſtump, from within outward, exactly at the ſame diſtance from the lips of the wound: this done, the ſilk is to be tied in a bow-knot. With another needle and ſkain of ſilk, the ſame proceſs is to be repeated, in ſuch manner, that the ligatures may cut each other at right angles. If it is a large thigh, the lips of the wound may be made to approach each other ſo nearly, as that the diameter of the wound may be about two inches long:

long: but in this, and in all other ſtumps, the approximation of the lips will depend upon the laxneſs of the ſkin, and the quantity preſerved by an artful double inciſion; for the ſkin muſt not be drawn together ſo tight as to put it upon the ſtretch, leſt it ſhould bring on inflammation and pain.

The manner of applying the croſs-ſtitch after the amputation of a leg has nothing particular in it; only that the threads muſt be carried between the *tibia* and *fibula*, rather than directly over the *tibia:* and before the ſkin is drawn over the end of the ſtump, it will be proper to lay a thick doſſil of lint on the edges of the *tibia*, in order to prevent them from wounding the ſkin. The dreſſings muſt be ſuperficial; and to preſerve the wound clean, an injection of barley water, or warm milk, may be thrown in, with a ſmall ſyringe, between the ſtitches, which will prevent any matter from harbouring there.

I have adviſed the ſkains of ſilk to be tied with a bow-knot, that, in caſe of a *hæmorrhage*, they might be undone in order to diſcover the veſſels more eaſily; and alſo, if any tenſion ſhould enſue, that they might be looſened for three or four days, and then tied again when the ſuppuration comes on and the parts are more at liberty.

Perhaps it may be objected, that the double inciſion is of itſelf ſufficient for anſwering the

ends propoſed by this meaſure: but whoever is converſant in this branch of practice, muſt know, that notwithſtanding the lax ſtate of the ſkin and muſcles at the time of the operation, yet, ſome days after, they fall conſiderably back from the bone, and in the thigh particularly ſo much, that no bandage will ſuſtain them; the conſequence of which is a proportionable largeneſs of wound, a tedioufneſs of cure, and ſome degree of pointedneſs in the ſtump. It may be obſerved too, that the ſtrictneſs of bandage employed for ſupporting the ſkin and muſcles of the thigh, is not only painful, but in all probability may obſtruct the cure of the wound by intercepting the nutrition: for it is certain, that by long continuance it often waſtes the ſtump; and I am jealous it may alſo be acceſſary to abſceſſes, which ſometimes form amongſt the muſcles in different parts of the thigh.

The queſtion then remaining is, whether theſe ſtitches will ſupport the ſkin and muſcles more effectually than bandage, without producing ſome new evil, a point which can only be decided by experiment. It is true that this very method was followed by ſome of our anceſtors, and the objections to it have abſolutely prevailed over the arguments in favour of it; for few people now even know it ever was practiſed. Yet I cannot help imagining that caprice may have had more ſhare

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in utterly diſcarding this method, than reaſon and obſervation: for it is poſitively ſaid, by ſome of the moſt able and candid practitioners, to have ſucceeded marvelouſly; and as the inflammation and ſymptomatic fever, ſuppoſed to be excited by it, were always relievable by cutting or looſening the ſtitches, there does not ſeem to have been reaſonable grounds for wholly giving up ſuch great advantages.

But if the objections to it were of force when the ſingle inciſion was practiſed, they diminiſh exceedingly now that we perform the operation by the double inciſion; for though the double inciſion does not wholly prevent the withdrawing of the muſcles from the bone, yet it abates the degree of it ſo much, that they can ſuffer the ſtitches, without incurring either inflammation or pain, to which they were much more liable after the ſingle inciſion. It muſt be remarked, however, that they draw with that ſtrength as to make the ſtitches wear thro' the ſkin and fleſh in twelve or fourteen days: but this is done ſo gradually, that it cauſes very little pain or inflammation; and though they conſequently come off with the dreſſings, yet by this time the ſkin and muſcles are fixed, and a ſlight bandage will be ſufficient to maintain them in the ſame poſition.

The two greateſt objections I know of, to

this method, are, the deformity of the ſtumps, and the additional pain of the operation. But as a ſtump is not expoſed to view after the cure, its want of beauty is of no great conſequence: and though it muſt be granted that the ſtitches cannot be made without ſome pain, perhaps it will not be found ſo bad as one is apt at firſt to ſuggeſt; for the mere paſſing of a large needle through the fleſh, without making a *ſtricture*, is very bearable in compariſon of a tight ligature: but whatever be the increaſe of pain for the preſent, the future eaſe in conſequence of it, is an ample compenſation; and, if I am not miſtaken, there is ſtill another conſideration of a much higher importance than any I have mentioned, I mean a leſs hazard of life.

For the ſymptomatic fever, and the great danger of life attendant upon an amputation, do not ſeem to proceed purely from the violence done to nature by the pain of the operation and the removal of the limb, but alſo from the difficulties with which large ſuppurations are produced. And this is evident from what we ſee in very large wounds that are ſo circumſtanced as to admit of healing by inoſculation, or, as ſurgeons expreſs it, by the firſt intention: for in this caſe, we perceive the cure to be effected without any great commotion; whereas the ſame wound, had it been left to ſuppurate, would have occaſioned

ſioned a a ſymptomatic fever, &c. but in both inſtances, the violence done by the mere operation is the ſame, whether the wound be ſewed up, or left to digeſt.

Upon this principle, we may account for the diminution of danger by following the method here propoſed: becauſe as the ſtitches have a power of holding up the fleſh and ſkin over the extremity of the ſtump till they adhere to each other in that ſituation, they actually do by this means leſſen the ſurface of the wound; in conſequence of that, the ſuppuration; and, in conſequence of both, the danger reſulting from the ſuppuration.

In amputating the thigh, the firſt inciſion is to be made a little more than two inches above the middle of the *patella*. After the operation, a roller ſhould be carried round the body, and down the thigh, to ſupport the ſkin and fleſh: this is alſo the moſt proper bandage, as abſceſſes will ſometimes form in the upper part of the thigh, which cannot diſcharge themſelves ſo conveniently with any other, it being almoſt impracticable to roll above the abſceſs, unleſs we begin from the body.

The amputation of the arm or cubit differs ſo little from the foregoing operations, that it will be but a repetition to deſcribe it. However, it muſt be laid down as a rule, to preſerve as much of the limb as poſſible, and, in

all amputations of the upper limbs, to place your patient in a chair.

There are in the army a great many inſtances of gun-ſhot wounds of the arm near the *ſcapula*, which require amputation at the ſhoulder; but the apprehenſion of loſing their patients on the ſpot by the hæmorrhage, has deterred ſurgeons from undertaking it. I have known where it has been done more than once with ſucceſs; but though it had never been performed, we might learn it is practicable, from the caſe of a poor miller, whoſe arm and *ſcapula* were both torn from his body, by a rope which was accidentallytwiſted round his wriſt, and ſuddenly drawn up by the mill. Almoſt every one in *London* knows the ſtory, and that he recovered in a few weeks. It is very remarkable in this accident, that, after fainting, the hæmorrhage ſtopped of itſelf, and never bled afreſh, though nothing but lint and turpentine were laid on the great veſſels. In caſe, therefore, of a wound or fracture near the joint, or incurable fiſtulas in the joint, not attended with much caries, I think the operation may be performed ſafely in this manner.

The patient being laid on his back, with his ſhoulder over the edge of the table, make an inciſion through the *membrana adipoſa*, from the ſhoulder acroſs the pectoral muſcle, down to the armpit: and in order to ſave as much

ſkin

ſkin as poſſible, begin it about two inches below the joint; then turning the knife with its edge upwards, divide that muſcle, and part of the *deltoid:* all which may be done without danger of wounding the great veſſels, which will become expoſed by theſe openings; if they be not, cut ſtill more off the *deltoid* muſcle, and carry the arm backward. Then with a ſtrong ligature having tied the artery and vein, carefully divide thoſe veſſels at a conſiderable diſtance below the ligature, and purſue the circular inciſion thro' the joint, cutting firſt into that part of the burſal ligament which is the neareſt to the *axilla:* for if you attempt to make way into the joint, on the upper part of the ſhoulder, the projection of the *proceſſus acromion* and *proceſſus coracoides*, will very much embarraſs, if not baffle the operation. After the amputation, the croſs-ſtitch may be practiſed here with great benefit.

The amputation of the fingers and toes are better performed in their articulation, than by any of the other methods. For this purpoſe, a ſtraight knife muſt be uſed, and the inciſion of the ſkin be made not exactly upon the joint, but a little towards the extremity of the fingers, that more of it may be preſerved for the eaſier healing afterwards. It will alſo facilitate the ſeparation in the joint, when you cut the finger from the *metacarpal* bone, to make two ſmall longitudinal inciſions on

each ſide of it firſt. In theſe amputations, there is generally a veſſel or two that require tying, and which often prove troubleſome when the ligature is omitted.

It may happen that the bones of the toes, and part only of the *metatarſal* bones, are carious; in which caſe, the leg need not be cut off, but only ſo much of the foot as is diſcovered. A ſmall ſpring-ſaw is better to divide with here, than a large one. When this operation is performed, the heel and remainder of the foot will be of great ſervice, and the wound heal up ſafely, as I have found by experience.

PLATE XIV.

The EXPLANATION.

A. The figure of the amputating knife. The length of the blade and handle ſhould be about thirteen inches.

B. The figure of the ſaw uſed in amputating the limbs. The length of the handle and ſaw ſhould be about ſeventeen inches.

CHAP. XXXVIII.

Of INOCULATION.

IT is uſual to prepare the patient for this operation, by diet and evacuations; which,

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which, according to the habit of body, are to be more or leſs ſevere. Some phyſicians recommend frequent bleedings or purgings, with a ſtrict milk-diet, the preceding two months; others, a regimen of mercurial alteratives, with gentle purges at proper intervals, for the ſame length of time. But I think thoſe of the greateſt eminence in *London* ſeldom preſcribe bleeding more than once, and frequently not at all; truſting to an abſtemious courſe of life, and two or three gentle purges, and ſometimes to one only, the week before the operation, at leaſt where the ſubject is young.

The proper time for inoculation, is generally ſuppoſed to be infancy; and ſome think the earlier, the better. But as children, the two or three firſt years of their life, are ſubject to many terrible diſorders from the circumſtance of breeding their teeth, and indeed ſeem more liable to fatal convulſions upon the eruption of the ſmall-pox than after that time, I believe it is adviſable to poſtpone the operation till they are three or four years old: when, probably, the longer it is deferred, ſo much the worſe; though the ſucceſs of this practice has been ſurpriſing, even in the moſt advanced age.

Phyſicians have not unanimouſly determined which is the preferable part for inoculation, the arms or legs; and ſome order the

the operation to be performed in one of each. In either caſe, it is right to do it in two places; though probably it will not be abſolutely neceſſary: but as one of the applications may by accident fall off, or ſlip on one ſide from the orifice, the other will generally take effect, and prevent a diſappointment. The practice of inoculating in the legs is preferred to the other method by ſome, from an obſervation that the inciſions in theſe parts are more diſpoſed to ulcerate and yield a greater diſcharge than thoſe in the arms, which circumſtance they imagine to be advantageous, upon a perſuaſion it makes a powerful revulſion of the morbid matter from the face and throat. On the contrary, the advocates for inoculating in the arms, adviſe it for the very reaſon that the orifices are leſs liable to become ſore and painful: alleging, that the diſcharge from the wounds cannot be favourable to the eruption, ſince it ſeldom happens till the puſtules appear, and are even ripe; or ſhould it be judged neceſſary, from the nature of the diſtemper, or the patient's conſtitution, to continue the diſcharge, ſtill it may be done as efficaciouſly in the arms by converting one or both inciſions into an iſſue. Theſe conſiderations have induced the generality of phyſicians to approve of this laſt method.

The operation is to be performed after this

this manner. You muſt with a ſtocking-needle prick five or ſix large puſtules on the arm or leg of the ſubject you inoculate from, when they are plumpeſt, and the diſtemper is at its height: then taking a few threads of lint, roll them up ſo as to make one thread of the thickneſs of fine worſted: draw this over the orifices made into the puſtules, till a ſufficient quantity of it is moiſtened by the matter iſſuing out of them. Cut this thread into pieces of the length of a barley-corn, and put them immediately into a little box or bottle, which ſhould be ſhut up cloſe; and though perhaps the matter may retain its efficacy for many hours or days, yet it is adviſable to uſe it as ſoon as poſſible. It would be of no importance, what part of the arms or legs were to receive the infection, but that a drain may be deſirable after the illneſs; and therefore the inciſions ſhould be in thoſe places where iſſues are generally ordered, that, by putting in a pea, you may at pleaſure procure a diſcharge from them as long as you ſhall think proper, a month, two months, or more. The orifices ſhould be cut with a lancet, the length of a barley-corn, and ſo ſhallow as barely to fetch blood. The pieces of lint muſt be laid exactly on them, and ſecured in their ſituation by a ſticking plaſter and bandage. This application ſhould remain twenty-four or thirty-ſix hours; and afterwards, the orifices

may

may be treated every day with digeſtives or other medicines, according to their degree of inflammation, ulceration, and pain. After the operation, the patient muſt be confined, and live low till the time of the eruption, which is uſually about the eighth or ninth day, when the diſtemper is to be managed as in the ordinary method.

It is imagined by ſome, that the matter from an inoculated ſubject is leſs malignant than from a perſon who has the diſtemper, however mildly, in a natural way. But, I think, there is not a ſufficient foundation for this opinion. It is without doubt proper to take it from a kind ſort of a healthy ſubject: and though it is not probable any other conſtitutional illneſs will be communicated with the ſmall-pox by inoculation, rather than by the natural way, which nobody even ſuggeſts; yet, as we may have choice of patients to borrow it from, we ſhould not run any riſk, but fix on ſuch, if poſſible, who are under nine or ten years of age, and whoſe parents have always been healthy as well as themſelves.

It may not be amiſs to obſerve, that upon the introduction of the practice of inoculation into *England*, amongſt the many popular prejudices which prevailed againſt it, there was none of ſuch ſeeming weight, as the opinion that it did not abſolutely ſecure the patient

tient from contracting the diſtemper again in the natural way; but length of years, and a ſtrict inquiry, have at laſt entirely falſified this doctrine amongſt men of learning and candour. Great improvements have been made in *England* ſince the publication of the foregoing chapter, both in the method of inoculating, and the manner of treating the diſtemper; but as they are deſcribed with great preciſion by Baron *Dimſdale*, I ſhall refer the reader to his pamphlet on this ſubject.

FINIS.

Plates (13.)

1 pl. opp. p. 30
1 " " " 61
1 " " " 103
1 " " " 105
1 " " " 106
1 " " " 107
1 " " " 140
1 " " " 143
1 " " " 158
1 " " " 170
1 " " " 178
1 " " " 212
1 " " " 187

Plate No 1 opp. p. L is wanting